Smart Solutions for Today’s Geoscientist

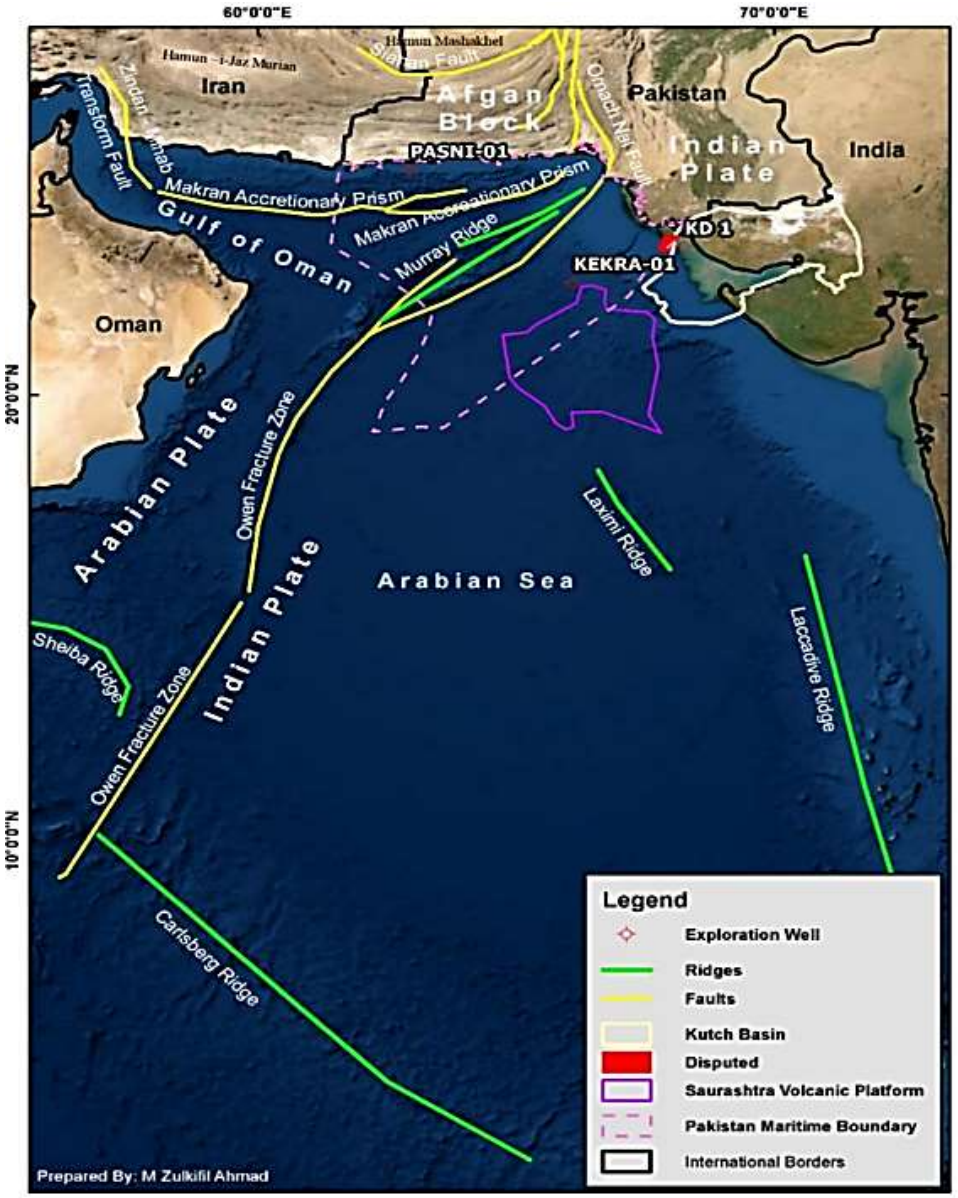
MAKRAN OFFSHORE BLOCKS

OFFSHORE BLOCK BIDDING ROUND 2025

MINISTRY OF ENERGY PETROLEUM DIVISION (DGPC)

TECTONIC SETTINGS

- Pakistan Offshore extends from south 700 km long coastal line along Arabian Sea.
- Makran Offshore Basin is located on Makran Accretionary Prism just in the west of Murray Ridge.
- Arabian Sea extends from border of Oman in west to Laccadive Ridge in east toward India; in South to Carlsberg Ridge.
- Owen Fracture Zone - Murray Ridge divides Arabian Sea crust into Arabian Plate in west and Indian Plate in east.
- Pakistan Offshore divided into Indus Offshore (Saurashtra Volcanic Arc in SSE) in east, extend toward west as Murray Ridge, Dalrymple Trough and Makran Accretionary Prism.
- Arabian plate is in the south of Makran Accretionary Prism.



Adeel Nazeer et, al., (2022) An Overview of Petroleum Potential of Pakistan Offshore: PAPG/SPE Annual Technical Conference.
N Khan et al., 2016) Sequence stratigraphic analysis of Eocene Rock Strata, Offshore Indus, southwest Pakistan: Mar Geophysics

GEOLOGICAL PERSPECTIVE

Late Cretaceous – Early Paleocene:

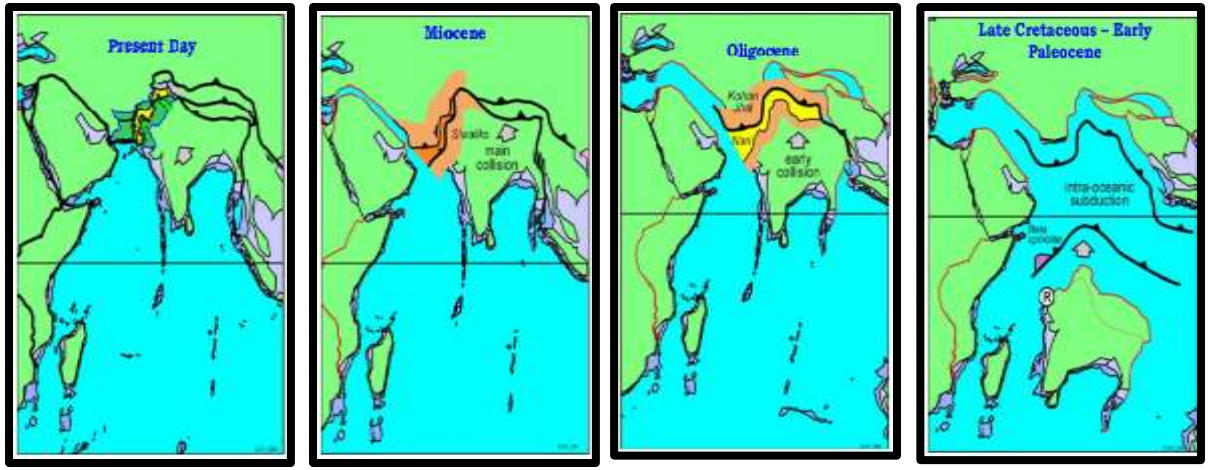
- Rapid northward movement of Indian Plate after separation from Madagascar.
- Bela ophiolites obduction.
- Extrusion of Deccan Volcanic.

Paleocene - Eocene

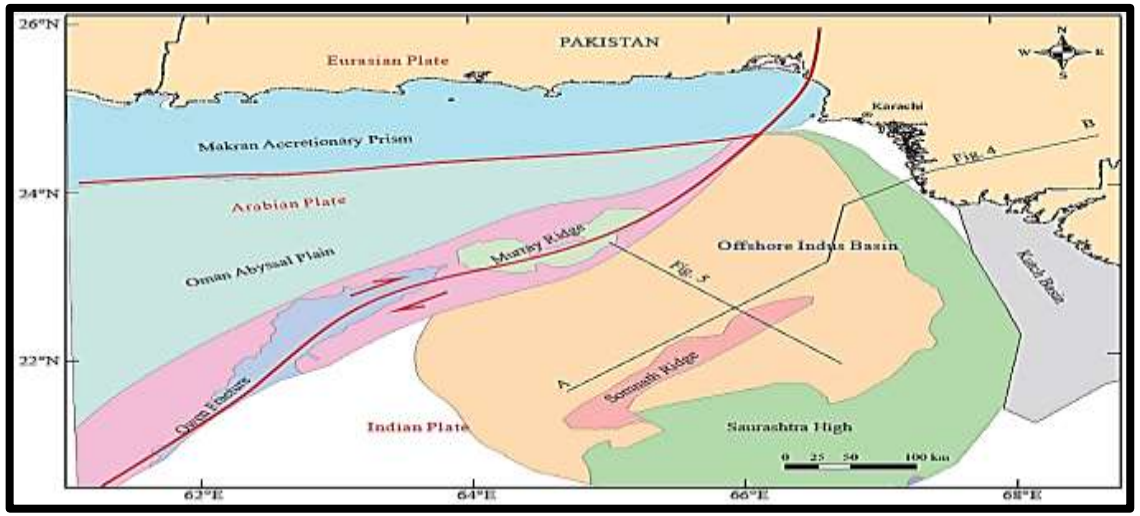
- Deposition of limestone on seamounts and shales in lows/depressions.

Oligo-Miocene:

- Himalayan orogeny
- Indus Delta-Fan deposition



A - Comparative Study of Some Major Tertiary Deltas of the World



B - Geotectonic location of Pakistan offshore (modified from Smith GL, 2013).

PETROLEUM SYSTEM

- **Source Rock**:

1. Miocene shales of Hoshab/ Siahan, Panjgur can be the source rock.
2. Miocene interbedded mudstone of Parkini Formation can also act as source rock.

- **Reservoir Rock:**

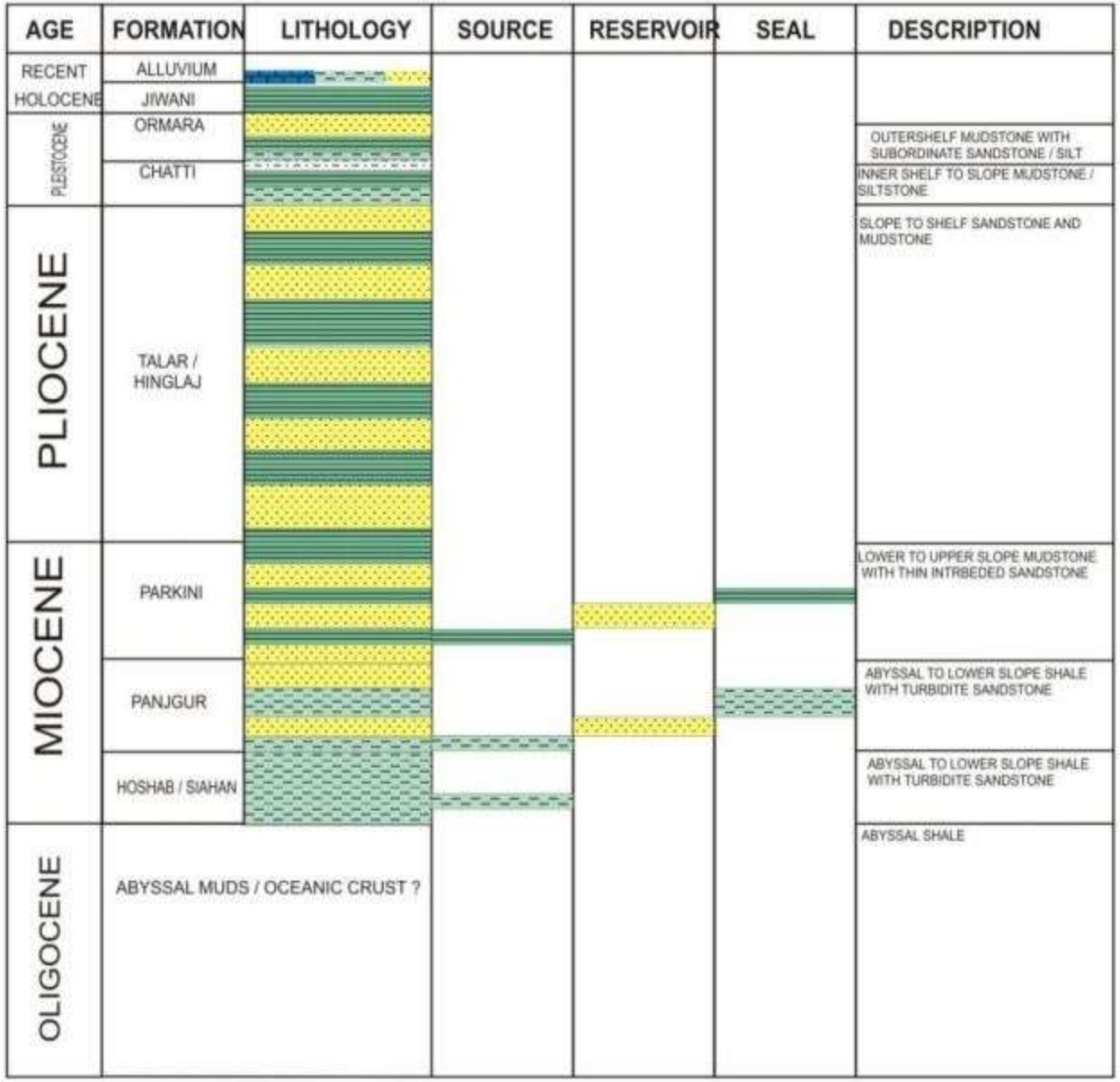
3. Miocene sandstones of Panjgur and Parkini Formation can act as reservoir rocks.

- **Seal Pairs**:

4. Intra-formational shales and mudstone of Miocene can provide seal for the Miocene sands.

- **Trap Geometries**:

5. Both structure and stratigrapic traps can be present in this area.



Cromie, Conall, et al. "Tectonostratigraphic evolution and hydrocarbon prospectivity south of Gwadar Bay, Makran accretionary wedge, offshore SW Pakistan." *Journal of Petroleum Geology* 45.2 (2022): 179-199.

RESERVOIR CORRELATIONS IN ADJACENT AREAS

Plays Types

Shelf Edge Carbonate Buildup	• Undrilled
Seal	• Intra-formational shales of Miocene and Oligocene my act as top seal.
Miocene Delta	• Tested by 5 wells, few were off structure & some didn't land in reservoir Pakcan-01 (flowed @ 3.7 MMscfd)
Channel Levee	• Untested –A vast Frontier
Deep Water Carbonate Buildup	• Drilled in Pak G2-1 & Kekra-01, excellent reservoirs but limited knowledge about charge

Basin / Well	Age	Lithology	Net Thickness (m)	Phi (v/v)	K (md)	Remarks
Offshore Indus Basin	Miocene	Deltaic Sands	10-20	18-25, with an average of 22	100-500, with an average of 514	Pakcan -01 Good reservoir is present
	Eocene	Reef Limestone				PakG2-01 Excellent reservoir
	Eocene	Reef Limestone		20-28		Kekra-01 Excellent reservoir
Indus Basin	Lower Eocene	Limestone	25	4-30	4	Excellent reservoir
	Paleocene	Sandstones	10	10-25		Good reservoir
	Cretaceous	Sandstones	15	15-22		Excellent reservoir
Kutch Basin	Cretaceous Naliya & Bhuj Formations	Fluvial-Deltaic Sands	30	25	32.8	GK-39-1 Very good reservoir
				18		GK-22C -1
	Lower Paleocene	Fluvial Sands		20-25	100-1000	GK-29A-1 Excellent reservoir
	Lower Eocene	Limestone	15			KD-1 (Good reservoir)
Bombay Basin	Miocene	Limestone		18-35	50-500	Good to very good reservoir
	Upper Eocene	Limestone		14-22	20-1000	

Modified after Gong, J. M., Liao, J., Liang, J., Lei, B. H., Chen, J. W., Khalid, M., & Meng, M. (2020). Exploration prospects of oil and gas in the North-western part of the Offshore Indus Basin, Pakistan. China Geology, 3(4), 633-642

SOURCE ROCK CORRELATIONS IN ADJACENT AREAS

Paleocene

Drilled only in Karachi South-01 well with TOC ranging from 1 -3%. Pakcan-01 adjacent block.

Miocene

■TOC ranges from 1% - 3.5% in Indus Marine A-1.

300m of source rock interval with TOC range of 1.26% - 3.24% drilled in Pakcan-01 well, however it turned out to be immature.

Basin / Well	Age	Lithology	TOC %	Type	R_0 (%)	Remarks
Indus Basin	Lower Cretaceous	Shale	3.5	II and III	0.87	Proven Hydrocarbon reserves exist with good to very good source rock.
	Upper Cretaceous	Shale / Mudstone	2.55 – 1.72	II and III	2.06 - 1.27	
	Paleocene	Shale	1.38 – 1.72	I	1.07 – 1.29	
	Eocene	Shale	1.19 – 6.19		1.01 – 1.11	
	Oligocene	Shale	9.75		1.44	
Kutch Basin	Lower Eocene	Shale / Lagoonal Lignite	0.86	II and III	0.94	Proven GKH1 well. In Cretaceous thin layers are observed.
	Paleocene	Calcareous Shale / Lignite Seams	0.58 – 0.37	II and III	>1.1	
	Cretaceous	Interbedded Shale and Coal	0.35 - 3	III and II	<0.5	
	Upper Jurassic	Shale	0.1 – 10.65	III and II	0.34 – 0.49	
	Lower Cretaceous	Shale	0.5 – 3			
Pakcan-1	Lower Miocene	Mudstones	0.55 – 3.24		0.6 – 0.9	Potential source rock is present.
Bombay Basin	Paleocene – Lower Eocene	Shale / Coal Seams	0.55-1			Good and mature source rock.
	Oligocene	Shale	≥1			
KS1-1	Paleocene – Eocene	Shale / Mudstones	3-4.5	III		Black Shale (~3m)
Karachi Offshore	Paleocene	Mudstone		III		Good source rock.

Modified after Gong, J. M., Liao, J., Liang, J., Lei, B. H., Chen, J. W., Khalid, M., & Meng, M. (2020). Exploration prospects of oil and gas in the North-western part of the Offshore Indus Basin, Pakistan. China Geology, 3(4), 633-642.

OPPORTUNITIES

1. Comparison suggests that discoveries in offshore deltas have been made in:

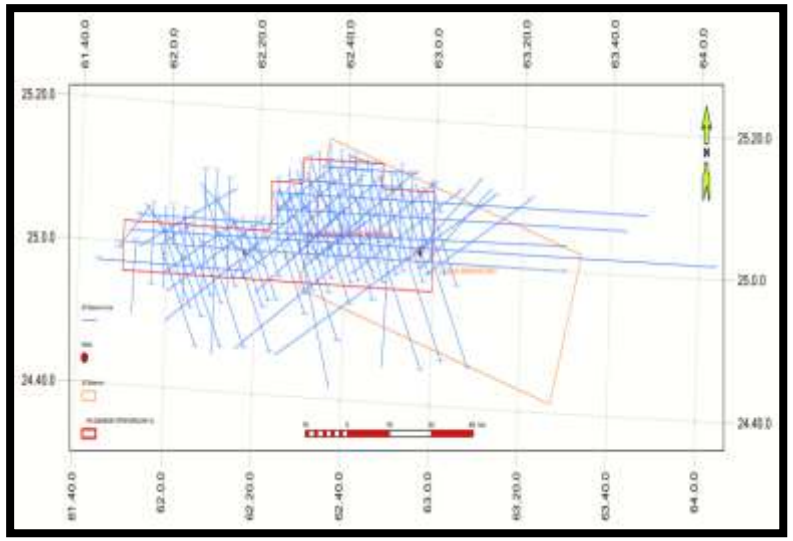
- Extension of proven onshore petroleum system to offshore at drillable depth (e.g. Niger, Nile, Irrawady & Mahakam deltas)
- Reservoir –Seal pairs associated with good quality but less mature source rock drilled onshore (at shallow depths) progressively mature in offshore (e.g. Krishna-Godavri and Nile deltas)
- Biogenic gas found in shallow younger Tertiary section (e.g. Krishna-Godavri and Nile deltas)

2. International offshore exploration efforts in delta areas have generally been successful due to:

- Extension of established onshore petroleum system to offshore at drillable depths
- Good quality less mature source rock drilled onshore progressively mature in offshore
- Gas discoveries of biogenic origin.

Gawadar Offshore (2461-5)

- **Area:** Gawadar Offshore covers an area of 2499.05 Sq. Kms.
- **Geological Basin**: Makran Offshore basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- NOIP, TEP,BP and CE acquired some 2D data approximately 381.77 (L. Kms) and seismic 3D data of about 2072.60 (Sq. Kms) in the block within the years 1975, 2016 and 2021.
- The Block is surrounded by Gawadar and Pasni West (North), Makran Offshore Ultra Deep-IX (South) and Makran Offshore Shallow-A (East) blocks.
- The well driiled in the vicinity is Garrokh-01.



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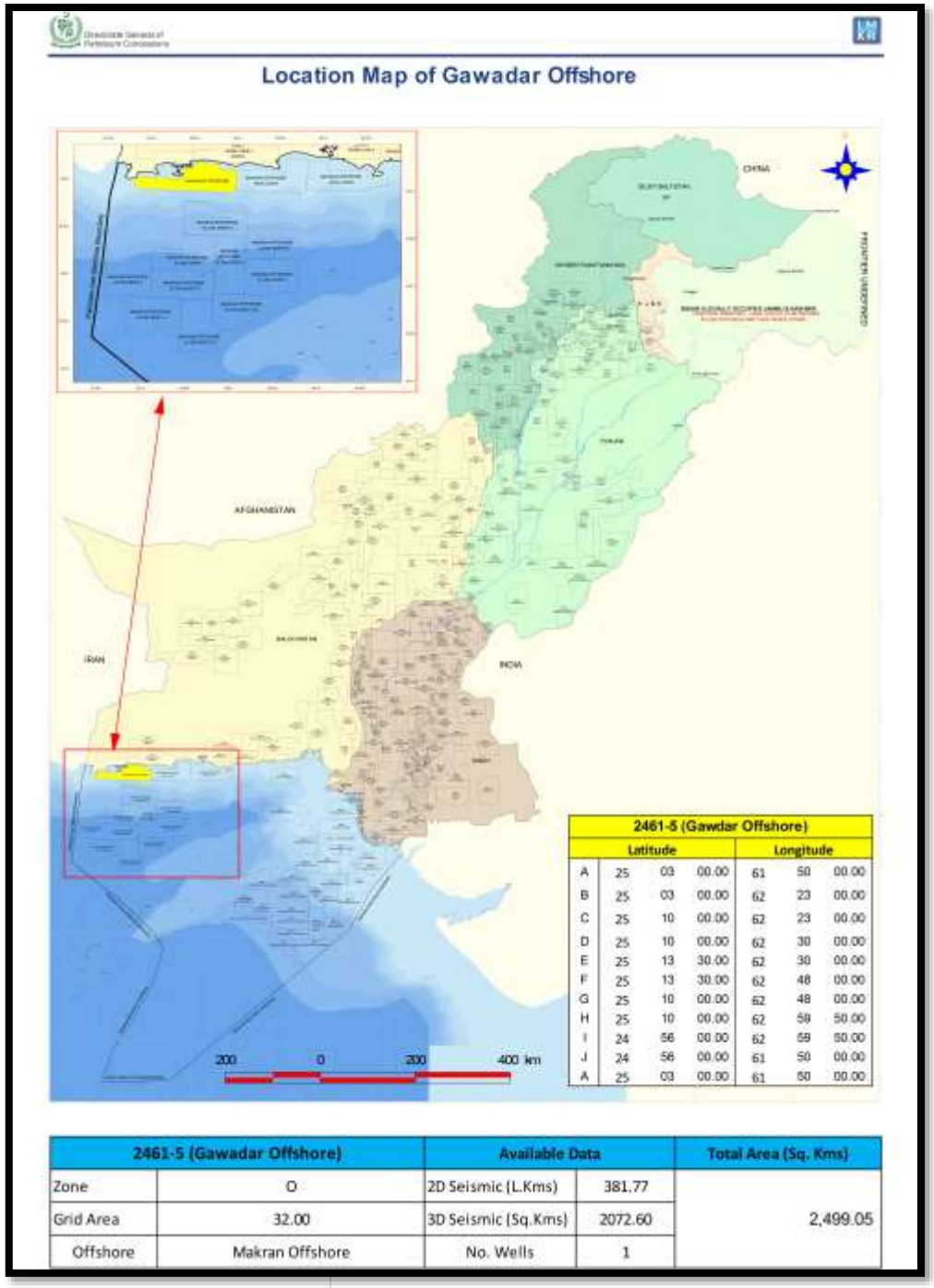
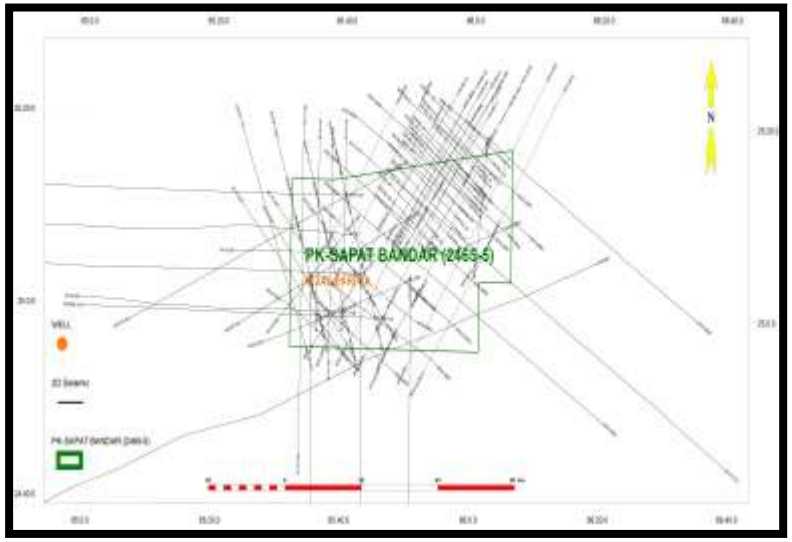


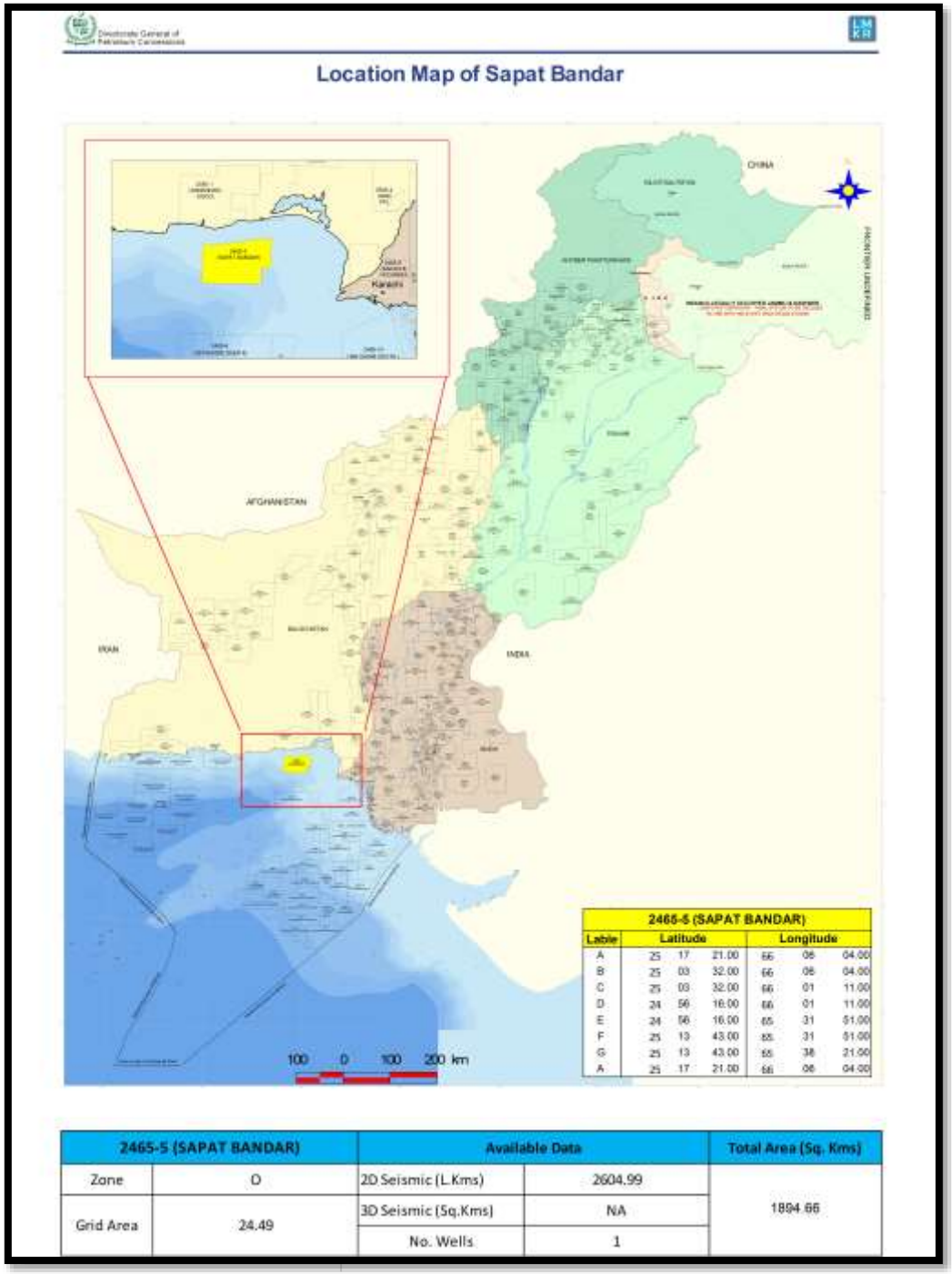
2461-5 (Gawadar Offshore)			
	Latitude	Longitude	
A	25 03 00.00	61 50 00.00	
B	25 03 00.00	62 23 00.00	
C	25 10 00.00	62 23 00.00	
D	25 10 00.00	62 30 00.00	
E	25 13 30.00	62 30 00.00	
F	25 13 30.00	62 48 00.00	
G	25 10 00.00	62 48 00.00	
H	25 10 00.00	62 58 30.00	
I	24 56 00.00	62 59 30.00	
J	24 56 00.00	61 50 00.00	
A	25 03 00.00	61 50 00.00	

2461-5 (Gawadar Offshore)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	381.77	2,499.05
Grid Area	32.00	3D Seismic (Sq.Kms)	2072.60	
Offshore	Makran Offshore	No. Wells	1	

Sapat bandar (2465-5)

- **Area:** Sapat Bandar covers an area of 1894.66 Sq. Kms.
- **Geological Basin**: Makran Offshore basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- NOIP, TEP,BP and CE acquired some 2D data approximately 2604.99 (L. Kms) in the block within the years 1973, 1975, 1976, 1997 and 1998.
- The Block is surrounded by Offshore Deep-K (South), and Samandar (North) blocks.
- The Well drilled in the vicinity is Jal Pari-01.



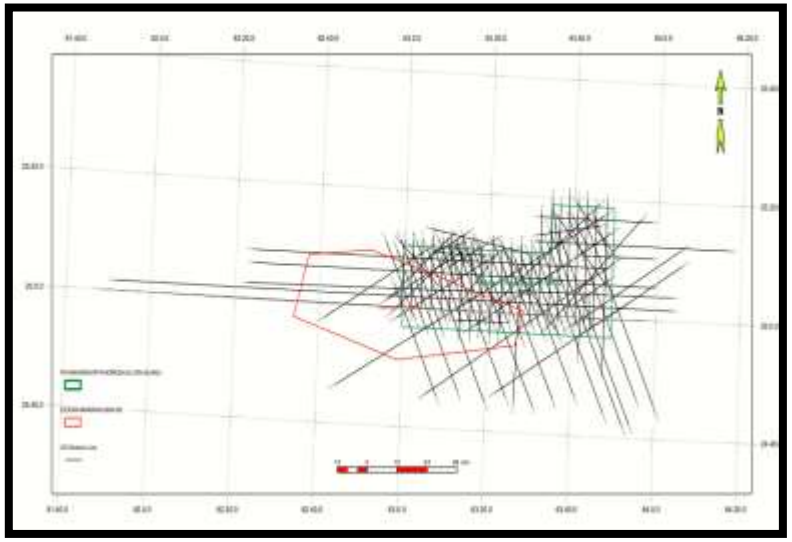


2465-5 (SAPAT BANDAR)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	2604.99	1894.66
Grid Area	24.49	3D Seismic (Sq.Kms)	NA	
		No. Wells	1	

*Riaz Ahmed 1998, Hydrocarbon Resource Base of Pakistan, Pakistan Journal of Hydrocarbon Research, Vol 10, 1-10

Makran Offshore Shallow-A (2462-2)

- **Area:** Makran Offshore Shallow-A covers an area of 2479.90 Sq. Kms.
- **Geological Basin**: Makran Offshore basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- NOIP, TEP,BP and CE acquired some 2D seismic data approximately 3633 (L. Kms) in the block within the years 1973, 1975, 1976 and 1997.
- The Block is surrounded by Pasni West (North), Makran Offshore Ultra Deep-IX and Makran Offshore Ultra Deep-III (South), Mkaran offshore Shallow-B (East) and Gawadar Offshore (West) blocks.



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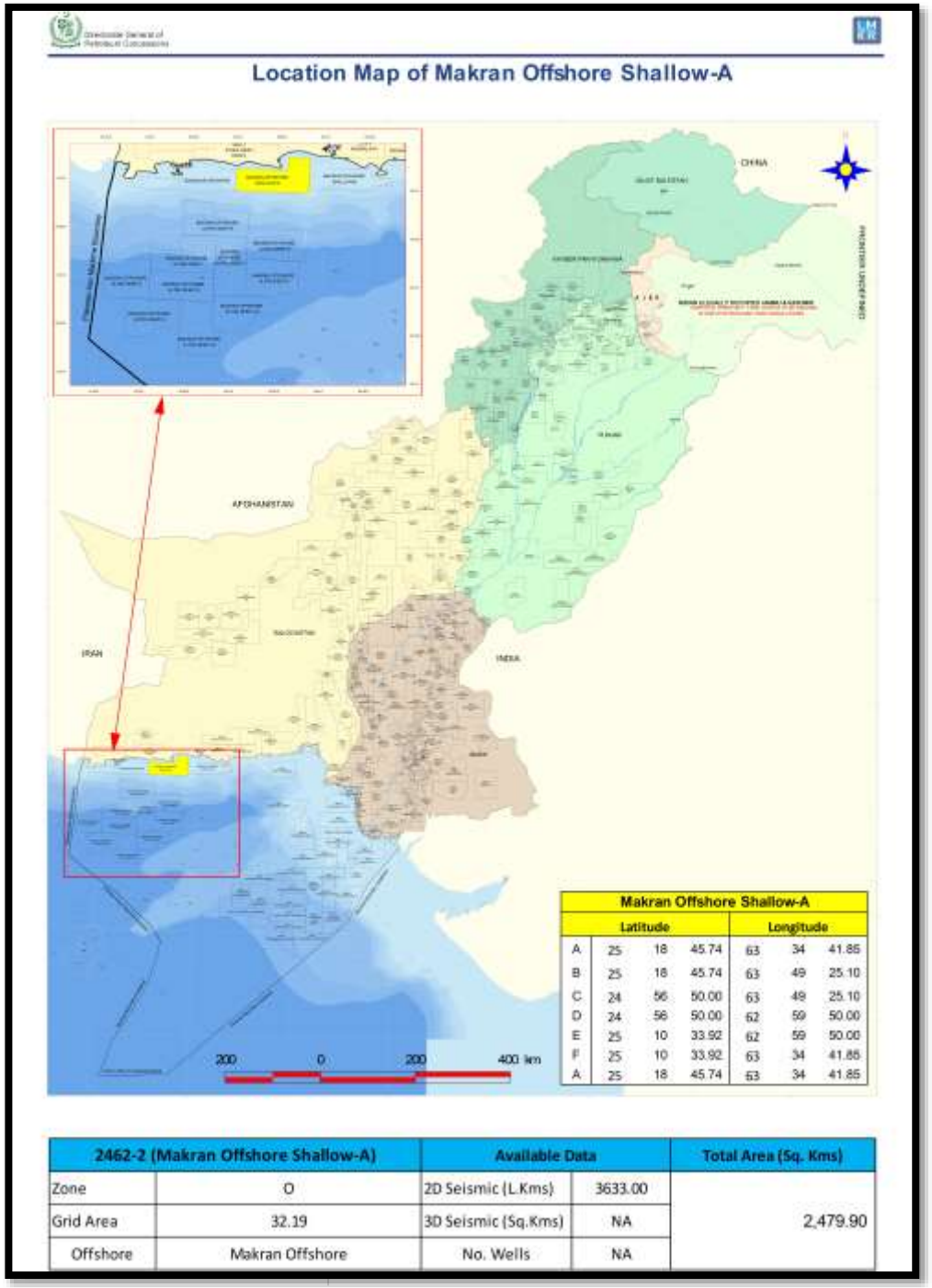
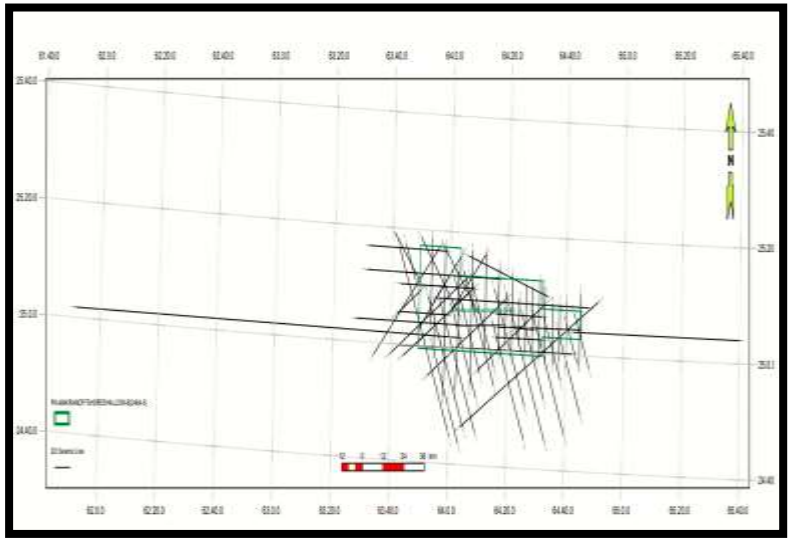


Makran Offshore Shallow-A	Latitude			Longitude		
A	25	18	45.74	63	34	41.85
B	25	18	45.74	63	49	25.10
C	24	56	50.00	63	49	25.10
D	24	56	50.00	62	59	50.00
E	25	10	33.92	62	59	50.00
F	25	10	33.92	63	34	41.85
A	25	18	45.74	63	34	41.85

2462-2 (Makran Offshore Shallow-A)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	3633.00	2,479.90
Grid Area	32.19	3D Seismic (Sq.Kms)	NA	
Offshore	Makran Offshore	No. Wells	NA	

Makran Offshore Shallow-B (2464-5)

- **Area:** Makran Offshore Shallow-B covers an area of 2115.16 Sq. Kms.
- **Geological Basin**: Offshore Makran basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- NOIP, TEP,BP and CE acquired some 2D seismic data approximately 2232.15 (L. Kms) and 3D seismic data approximately 2072.6 (Sq. Kms) in the block within the years 1973, 1975, 1976 and 1997.
- The Block is surrounded by Rasmalan-II (North), and Makran Offshore Shallow-A (West) blocks.



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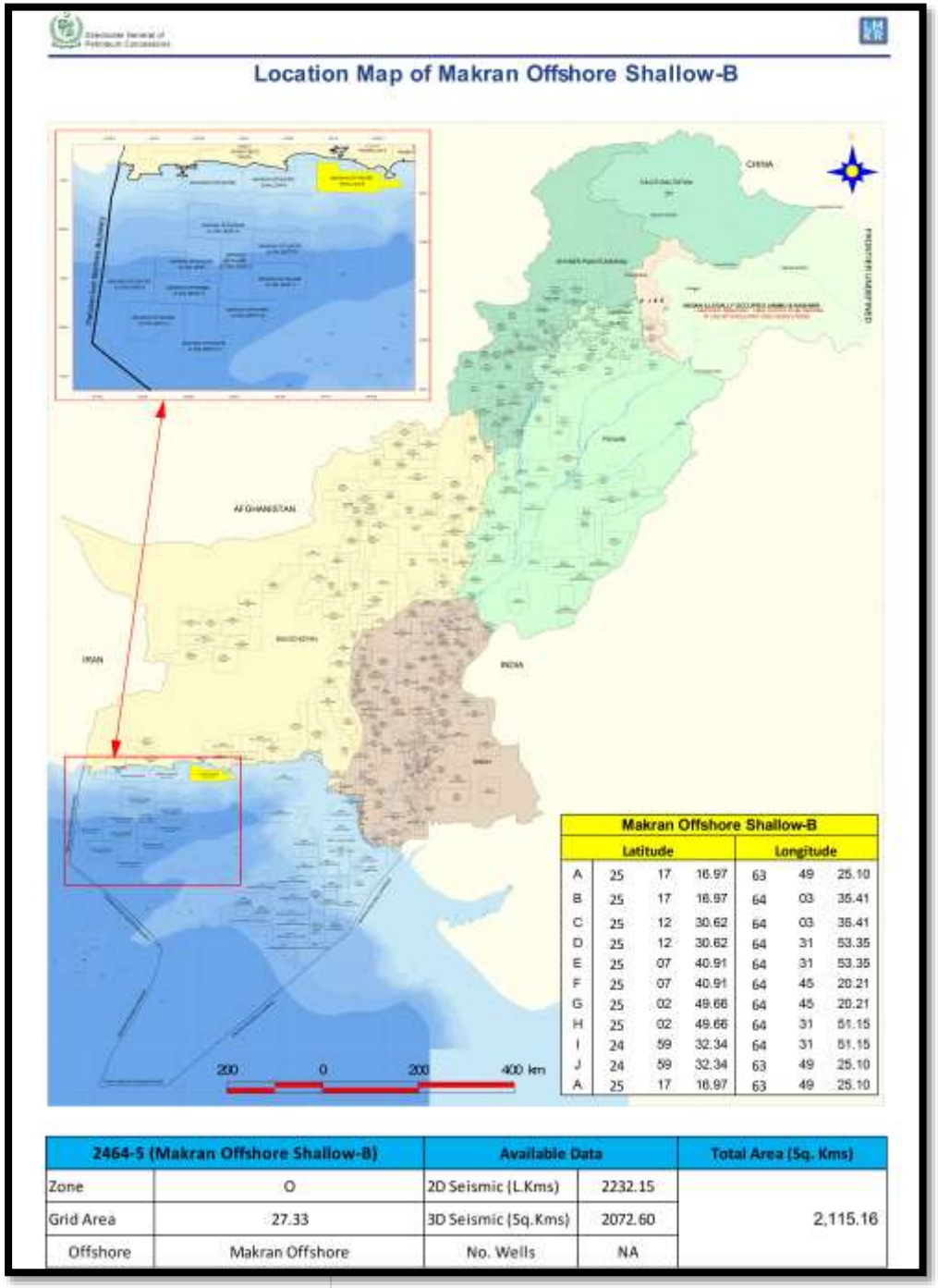
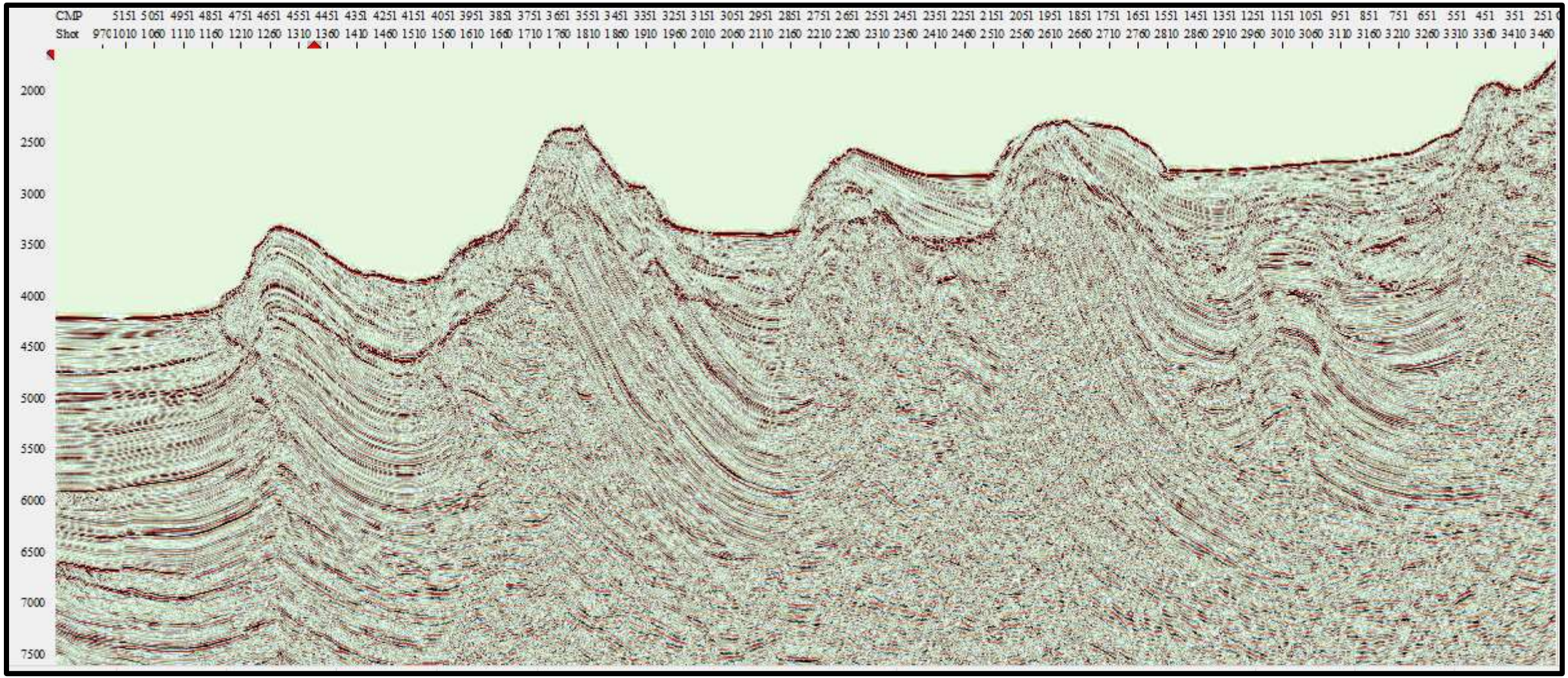


Makran Offshore Shallow-B						
	Latitude			Longitude		
A	25	17	16.97	63	49	25.10
B	25	17	16.97	64	03	35.41
C	25	12	30.62	64	03	35.41
D	25	12	30.62	64	31	53.35
E	25	07	40.91	64	31	53.35
F	25	07	40.91	64	45	20.21
G	25	02	49.66	64	45	20.21
H	25	02	49.66	64	31	51.15
I	24	59	32.34	64	31	51.15
J	24	59	32.34	63	49	25.10
A	25	17	16.97	63	49	25.10

2464-5 (Makran Offshore Shallow-B)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	2232.15	2,115.16
Grid Area	27.33	3D Seismic (Sq.Kms)	2072.60	
Offshore	Makran Offshore	No. Wells	NA	

PROSPECTIVITY



- High resolution seismic data can allow to delineate true potential of the block
- Both structural and stratigraphic traps.

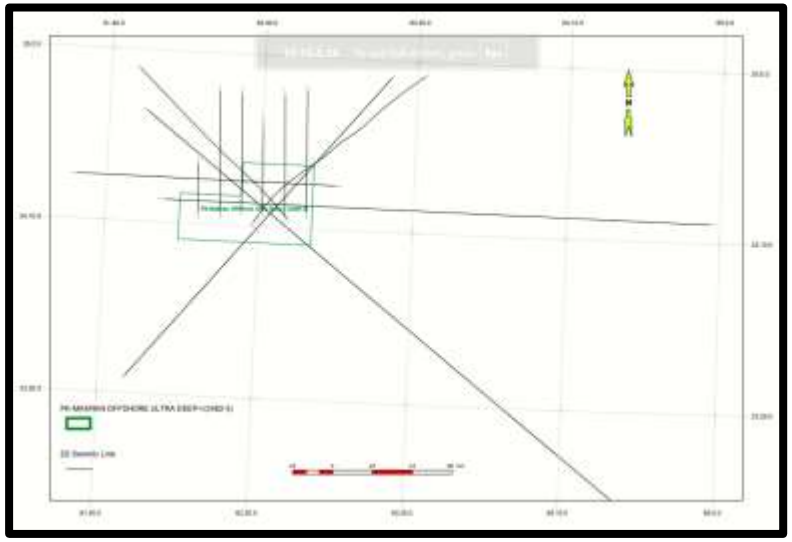
EXPLORATION RISKS

- Source & Charge: Low to Medium risk.
- Reservoir: Low to Medium risk.
- Seal: Low to Medium risk.
- Trap: Low to Medium risk.
- Key challenges for future exploration in Tertiary Petroleum System are to establish:

1. Distribution and timing of effective source intervals' development within the drainage area of prospect.
2. Timing of over-pressuring (up to 7000 psi at 2800m in Indus Marine-1A well) within Miocene section (for Miocene and younger targets) with respect to source rock maturation and expulsion.

Makran Offshore Ultra Deep-I (2462-3)

- **Area:** Makran Offshore Ultra Deep-I covers an area of 2498.72 Sq. Kms.
- **Geological Basin**: Makran Offshore basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- NOIP, TEP,BP and CE acquired some 2D data approximately 474 (L. Kms) in the block within the years 1973, 1998, 1999, and 2019.
- The Block is surrounded by Makran Offshore Ultra Deep-IX (North), Makran Offshore Ultra Deep-II (East), Makran Offshore Ultra Deep-IV (South) and Makran Offshore Ultra Deep-X (West) blocks.



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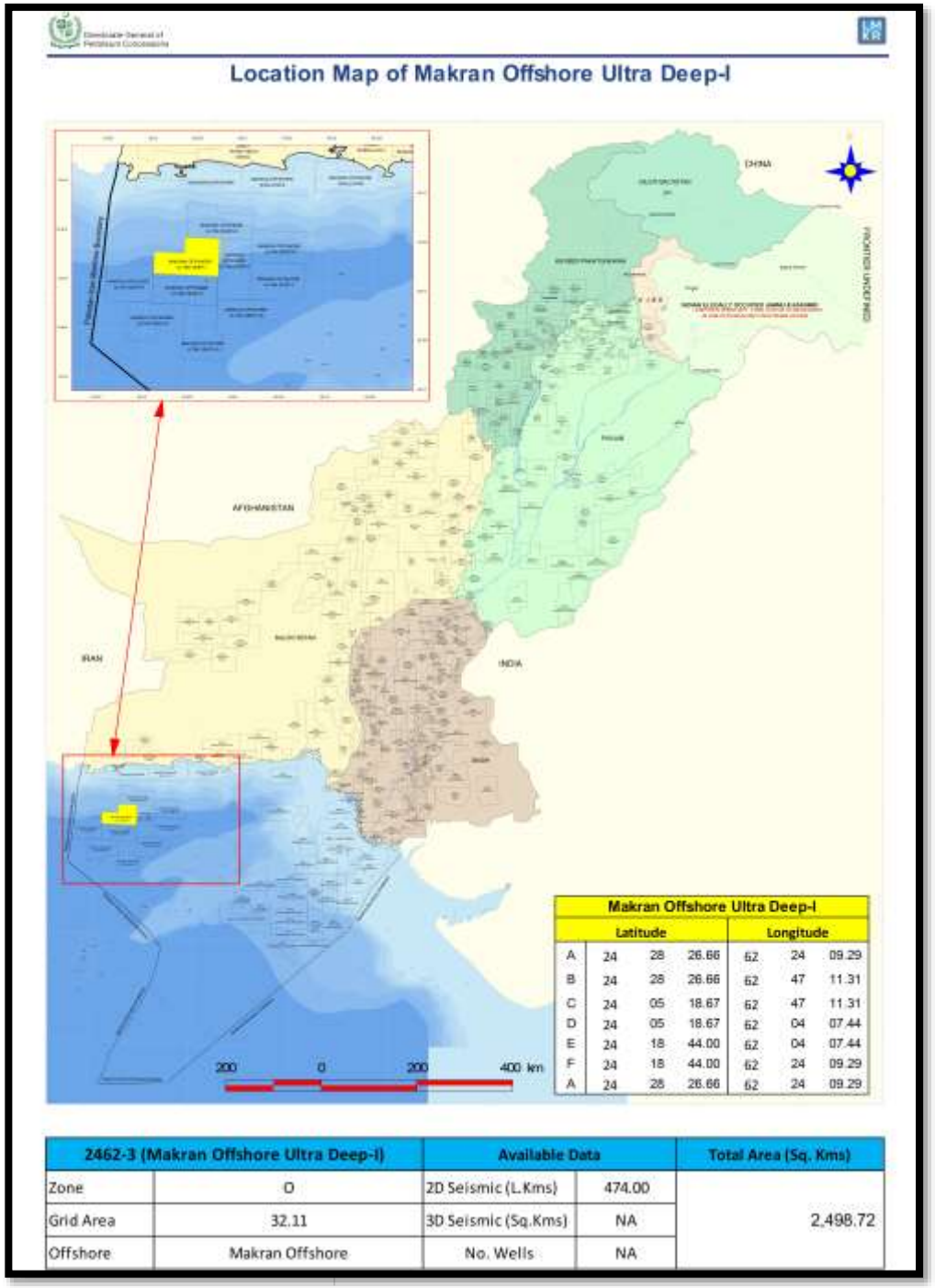
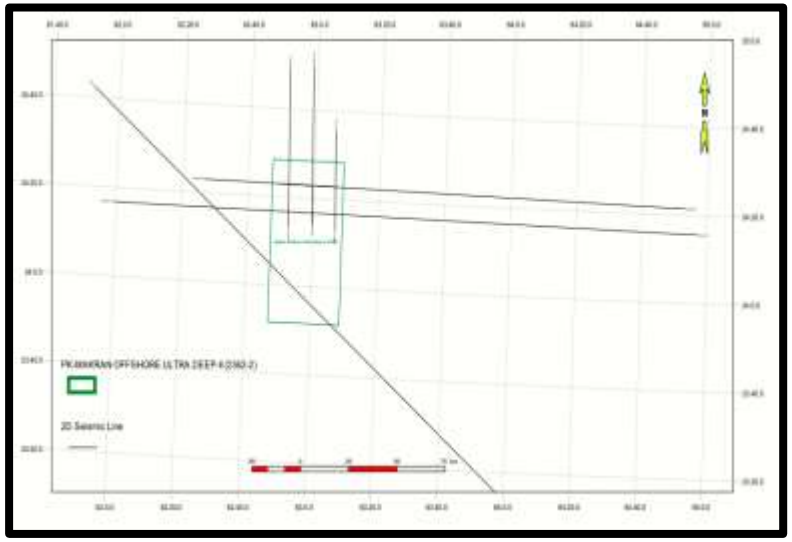


Makran Offshore Ultra Deep-I	Latitude			Longitude		
A	24	28	26.66	62	24	09.29
B	24	28	26.66	62	47	11.31
C	24	05	18.67	62	47	11.31
D	24	05	18.67	62	04	07.44
E	24	18	44.00	62	04	07.44
F	24	18	44.00	62	24	09.29
A	24	28	26.66	62	24	09.29

2462-3 (Makran Offshore Ultra Deep-I)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	474.00	2,498.72
Grid Area	32.11	3D Seismic (Sq.Kms)	NA	
Offshore	Makran Offshore	No. Wells	NA	

Makran Offshore Ultra Deep-II (2362-2)

- **Area:** Makran Offshore Ultra Deep-II covers an area of 2487.54 Sq. Kms.
- **Geological Basin**: Makran Offshore basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- NOIP, TEP,BP and CE acquired some 2D data approximately 415 (L. Kms) in the block within the years 1998, 1999 and 2019.
- The Block is surrounded by Makran Offshore Ultra Deep-IX (North), Makran Offshore Ultra Deep-III and Makran Offshore Ultra Deep-V (East), Makran Offshore Ultra Deep-VIII (South) and Makran Offshore Ultra Deep-IV and Makran Offshore Ultra Deep-I (West) blocks.



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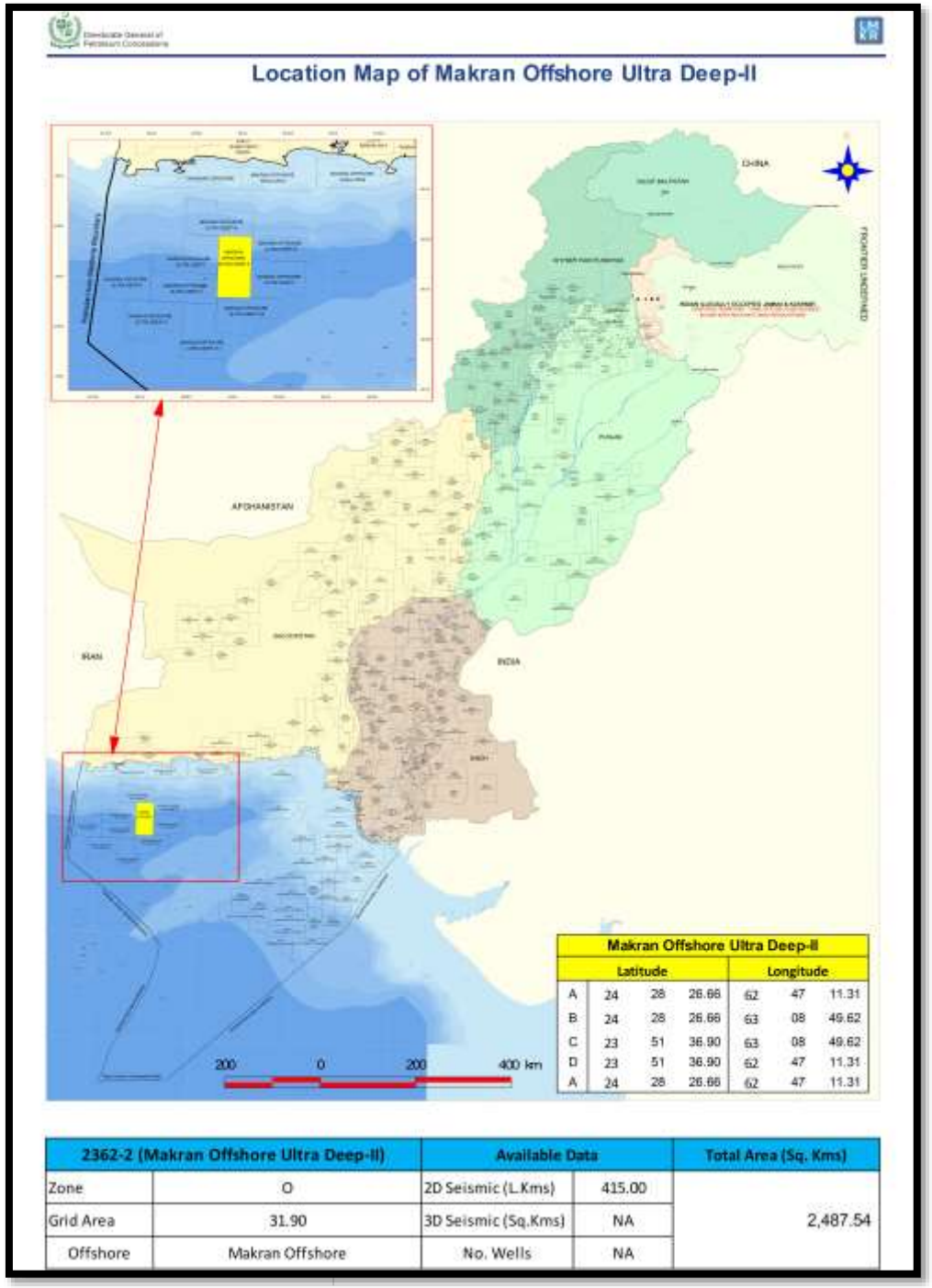
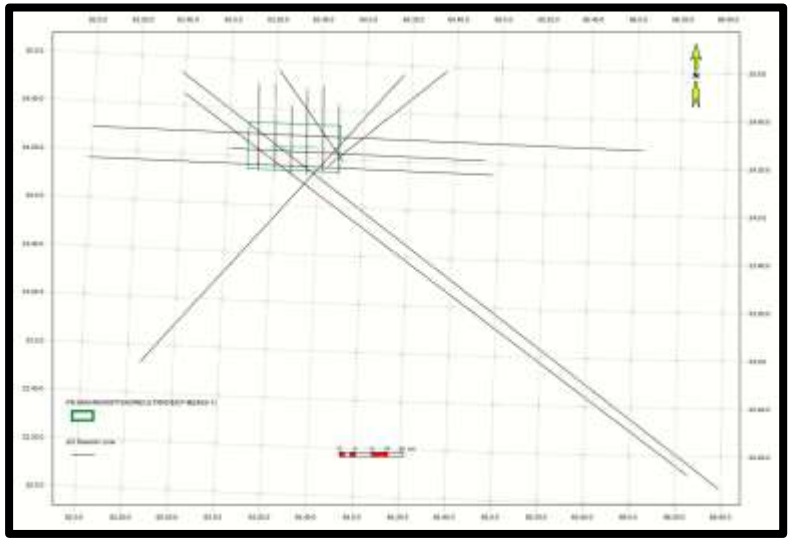


Makran Offshore Ultra Deep-II						
	Latitude			Longitude		
A	24	28	26.66	62	47	11.31
B	24	28	26.66	63	08	49.62
C	23	51	36.90	63	08	49.62
D	23	51	36.90	62	47	11.31
A	24	28	26.66	62	47	11.31

2362-2 (Makran Offshore Ultra Deep-II)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	415.00	2,487.54
Grid Area	31.90	3D Seismic (Sq.Kms)	NA	
Offshore	Makran Offshore	No. Wells	NA	

Makran Offshore Ultra Deep-III (2463-1)

- **Area:** Makran Offshore Ultra Deep-III covers an area of 2425.26 Sq. Kms.
- **Geological Basin**: Makran Offshore basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- NOIP, TEP,BP and CE acquired some 2D data approximately 1457 (L. Kms) in the block within the years 1973,1977, 1998 and 2019.
- The Block is surrounded by Makran Offshore Shallow-A (North), Makran Offshore Ultra Deep-V (South) and Makran Offshore Ultra Deep-IX and Makran Offshore Ultra Deep-II (West) blocks.



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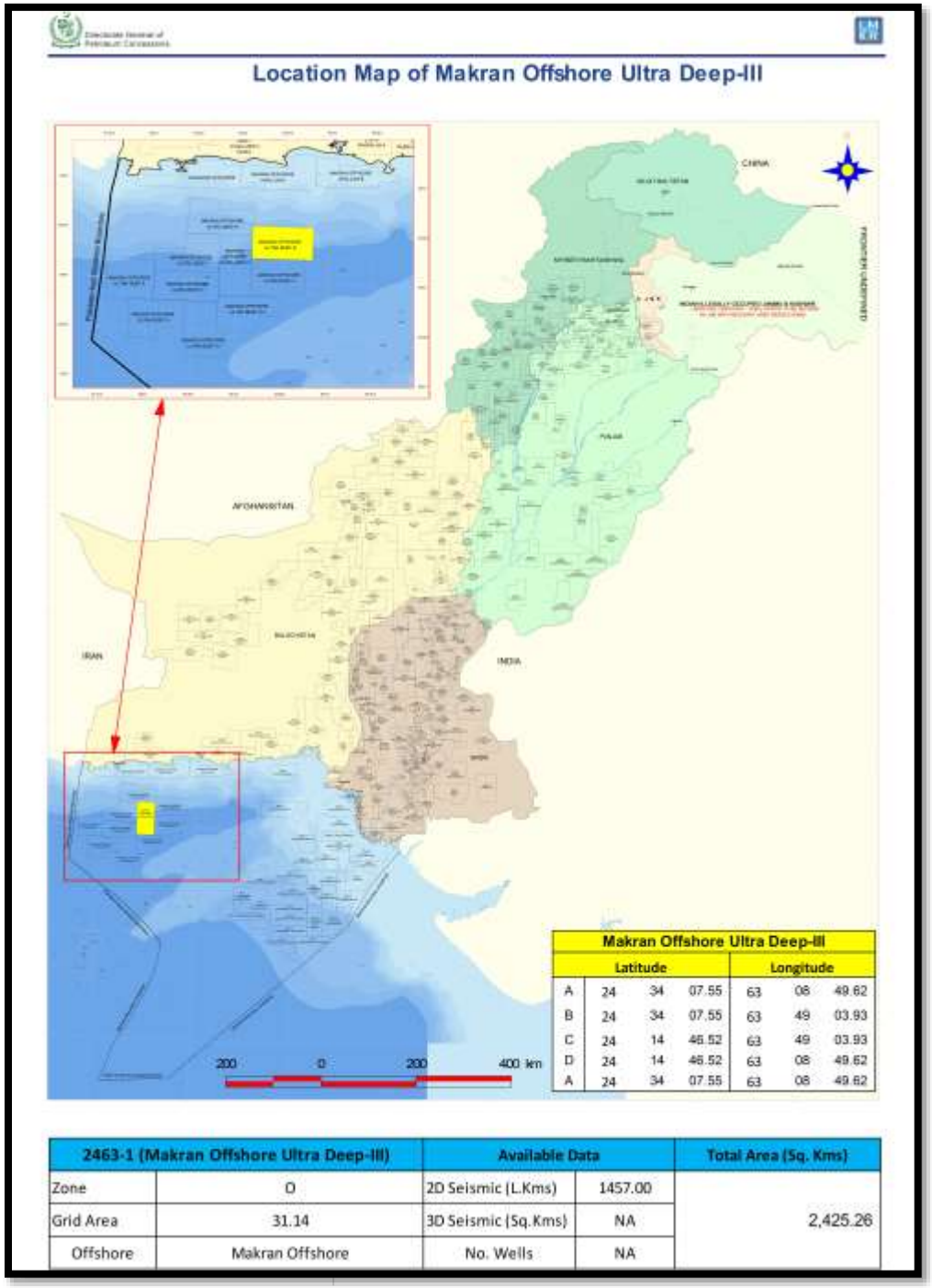
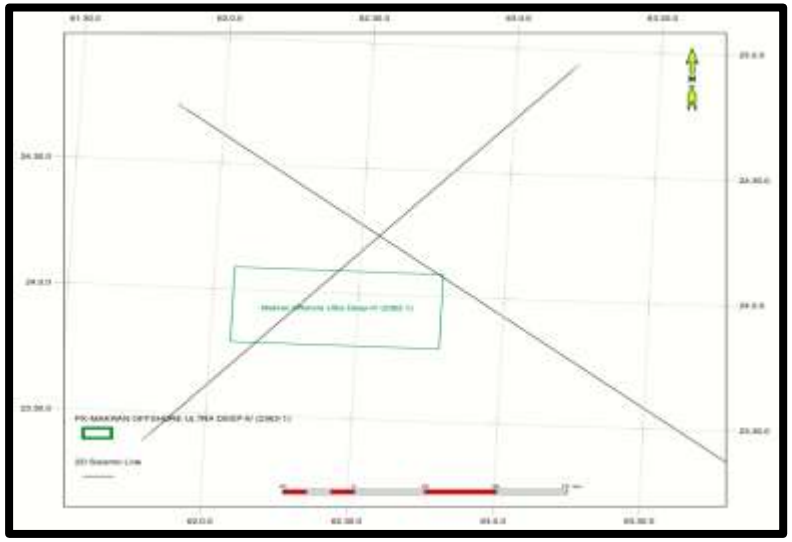


Makran Offshore Ultra Deep-III							
	Latitude			Longitude		
A	24	34	07.55	63	08	49.62
B	24	34	07.55	63	49	03.93
C	24	14	46.52	63	49	03.93
D	24	14	46.52	63	08	49.62
A	24	34	07.55	63	08	49.62

2463-1 (Makran Offshore Ultra Deep-III)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	1457.00	2,425.26
Grid Area	31.14	3D Seismic (Sq.Kms)	NA	
Offshore	Makran Offshore	No. Wells	NA	

Makran Offshore Ultra Deep-IV (2362-1)

- **Area:** Makran Offshore Ultra Deep-IV covers an area of 2403.52 Sq. Kms.
- **Geological Basin**: Makran Offshore basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Makran Offshore Ultra Deep-I (North), Makran Offshore Ultra Deep-II and Makran Offshore Ultra Deep-VIII (East), Makran Offshore Ultra Deep-VI and Makran Offshore Ultra Deep-VII (South) and Makran Offshore Ultra Deep-IV and Makran Offshore Ultra Deep-X (West) blocks.



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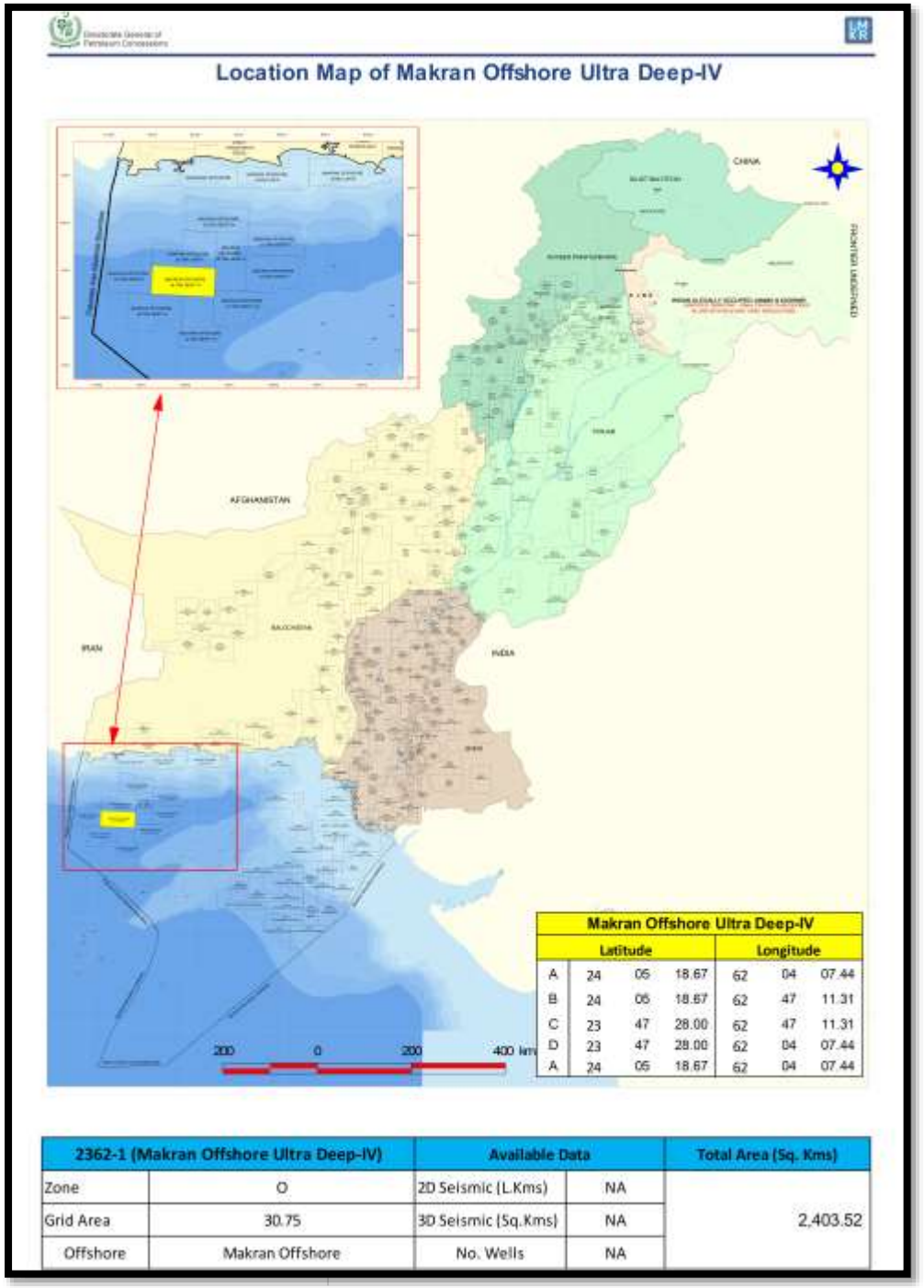
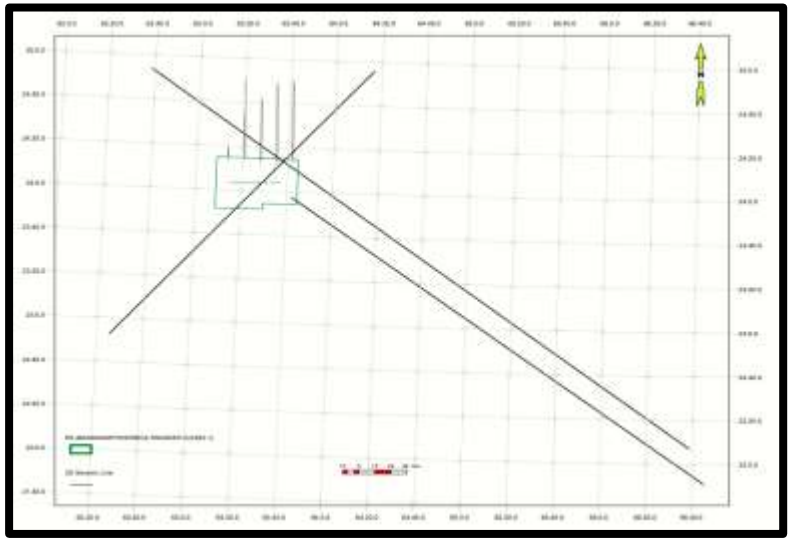


Makran Offshore Ultra Deep-IV						
	Latitude			Longitude		
A	24	05	18.67	62	04	07.44
B	24	05	18.67	62	47	11.31
C	23	47	28.00	62	47	11.31
D	23	47	28.00	62	04	07.44
A	24	05	18.67	62	04	07.44

2362-1 (Makran Offshore Ultra Deep-IV)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	NA	2,403.52
Grid Area	30.75	3D Seismic (Sq.Kms)	NA	
Offshore	Makran Offshore	No. Wells	NA	

Makran Offshore Ultra Deep-V (2363-1)

- **Area:** Makran Offshore Ultra Deep-V covers an area of 2460.41 Sq. Kms.
- **Geological Basin**: Makran Offshore basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- NOIP, TEP,BP and CE acquired some 2D data approximately 644 (L. Kms) in the block within the years 1998, 2007 and 2019.
- The Block is surrounded by Makran Offshore Ultra Deep-III (North), Makran Offshore Ultra Deep-VIII (South) and Makran Offshore Ultra Deep-II (West) blocks.



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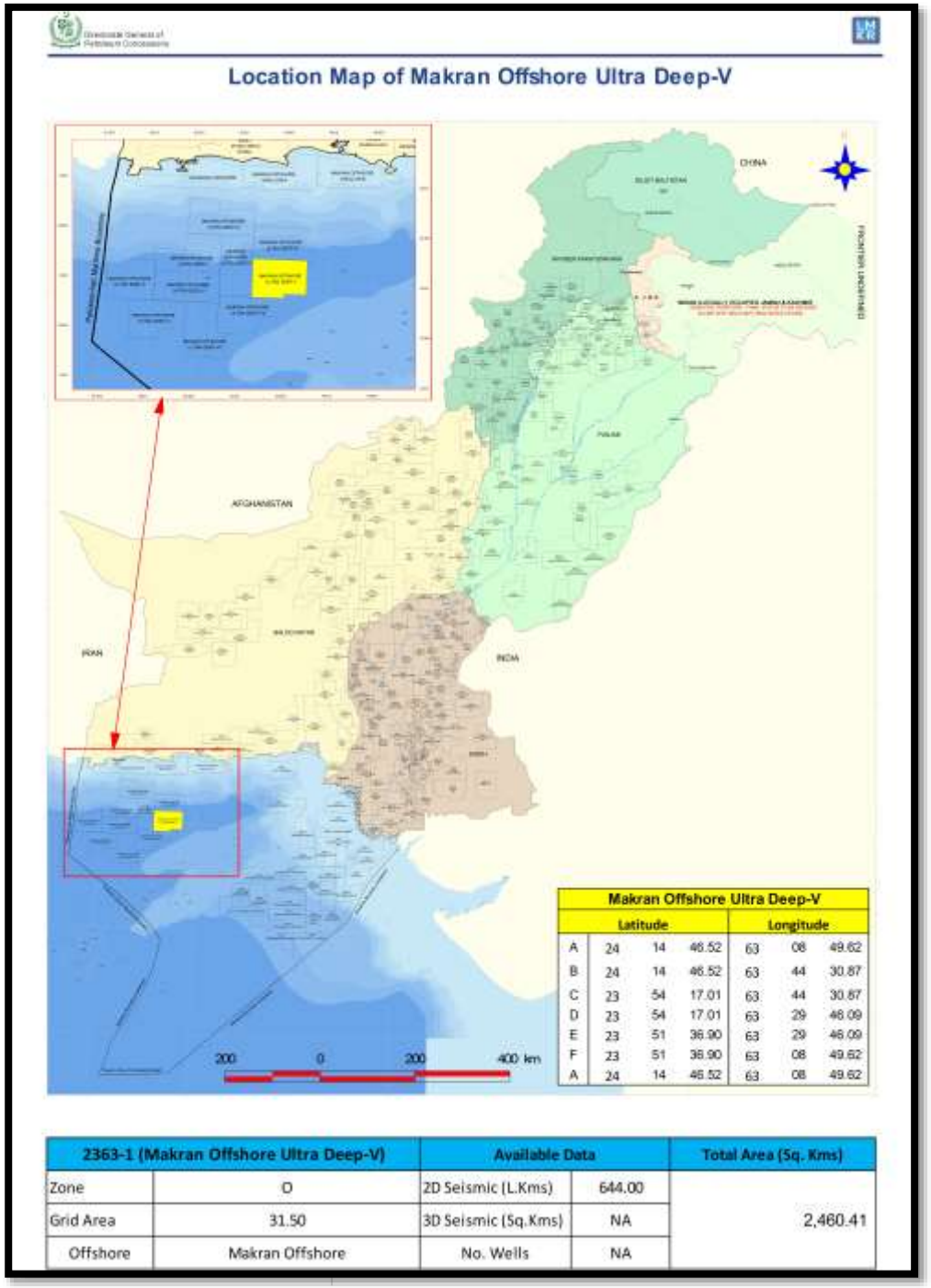
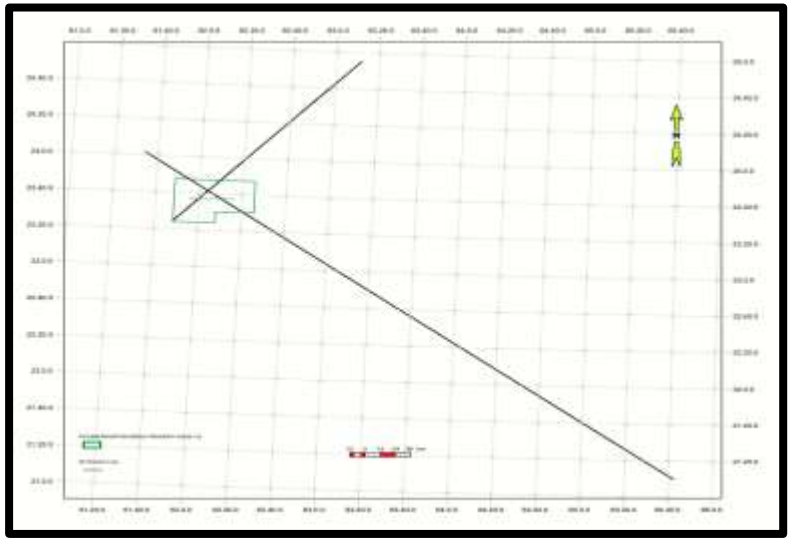


Makran Offshore Ultra Deep-V	Latitude			Longitude		
A	24	14	46.52	63	08	49.62
B	24	14	46.52	63	44	30.87
C	23	54	17.01	63	44	30.87
D	23	54	17.01	63	29	46.09
E	23	51	36.90	63	29	46.09
F	23	51	36.90	63	08	49.62
A	24	14	46.52	63	08	49.62

2363-1 (Makran Offshore Ultra Deep-V)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	644.00	2,460.41
Grid Area	31.50	3D Seismic (Sq.Kms)	NA	
Offshore	Makran Offshore	No. Wells	NA	

Makran Offshore Ultra Deep-VI (2361-2)

- **Area:** Makran Offshore Ultra Deep-VI covers an area of 2487.54 Sq. Kms.
- **Geological Basin**: Makran Offshore basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Makran Offshore Ultra Deep-X and Makran Offshore Ultra Deep-IV (North), and Makran Offshore Ultra Deep-VII (East) blocks.



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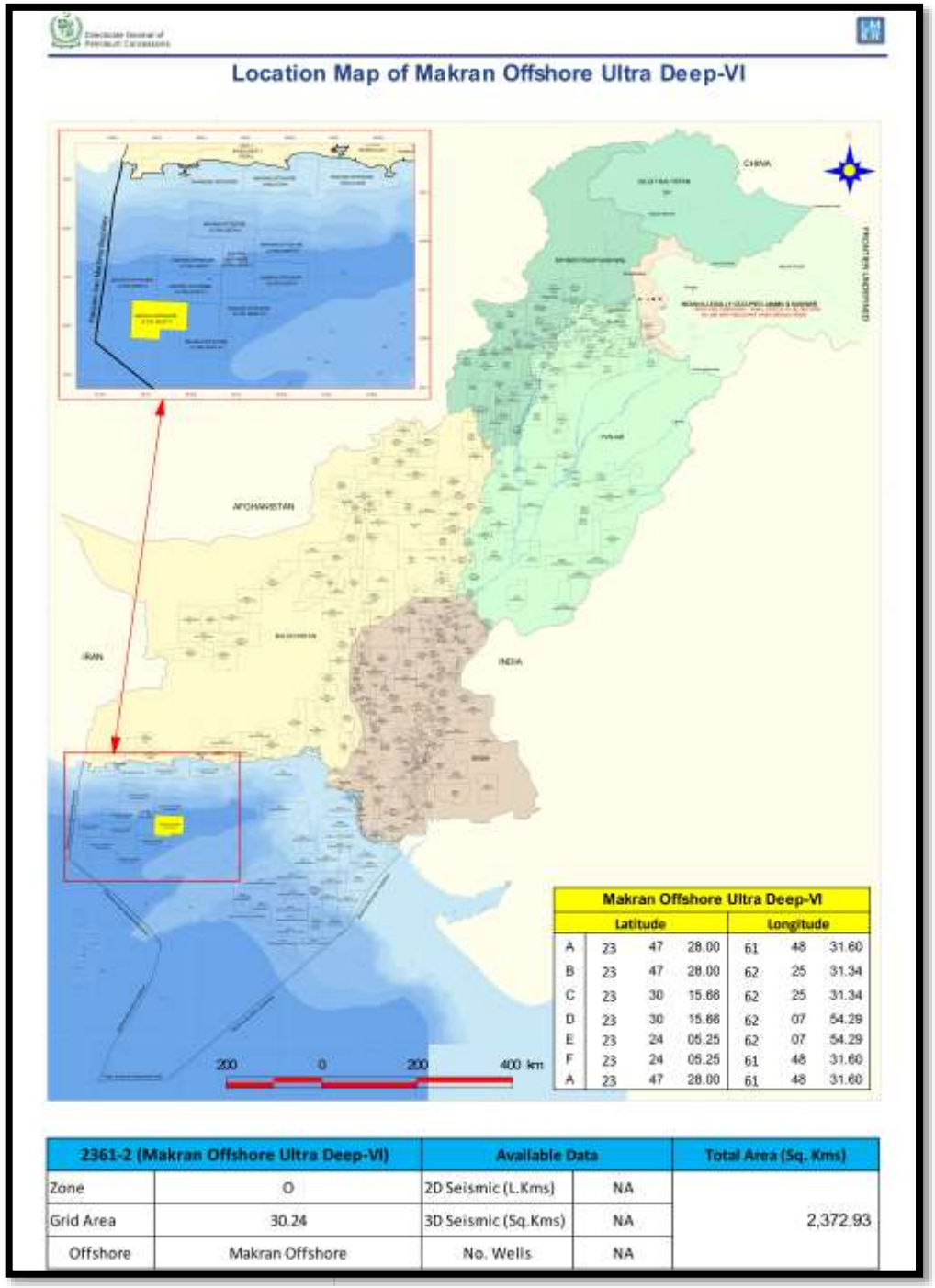
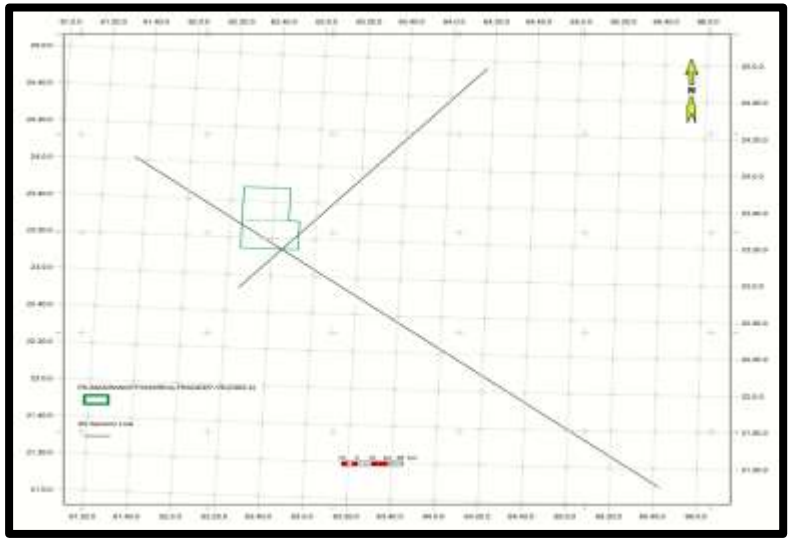


Makran Offshore Ultra Deep-VI	Latitude			Longitude		
A	23	47	28.00	61	48	31.60
B	23	47	28.00	62	25	31.34
C	23	30	15.66	62	25	31.34
D	23	30	15.66	62	07	54.29
E	23	24	05.25	62	07	54.29
F	23	24	05.25	61	48	31.60
A	23	47	28.00	61	48	31.60

2361-2 (Makran Offshore Ultra Deep-VI)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	NA	2,372.93
Grid Area	30.24	3D Seismic (Sq.Kms)	NA	
Offshore	Makran Offshore	No. Wells	NA	

Makran Offshore Ultra Deep-VII (2362-4)

- **Area:** Makran Offshore Ultra Deep-VII covers an area of 2491.60 Sq. Kms.
- **Geological Basin**: Makran Offshore basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- The Block is surrounded by Makran Offshore Ultra Deep-III (North), Makran Offshore Ultra Deep-VIII (South) and Makran Offshore Ultra Deep-II (West) blocks.



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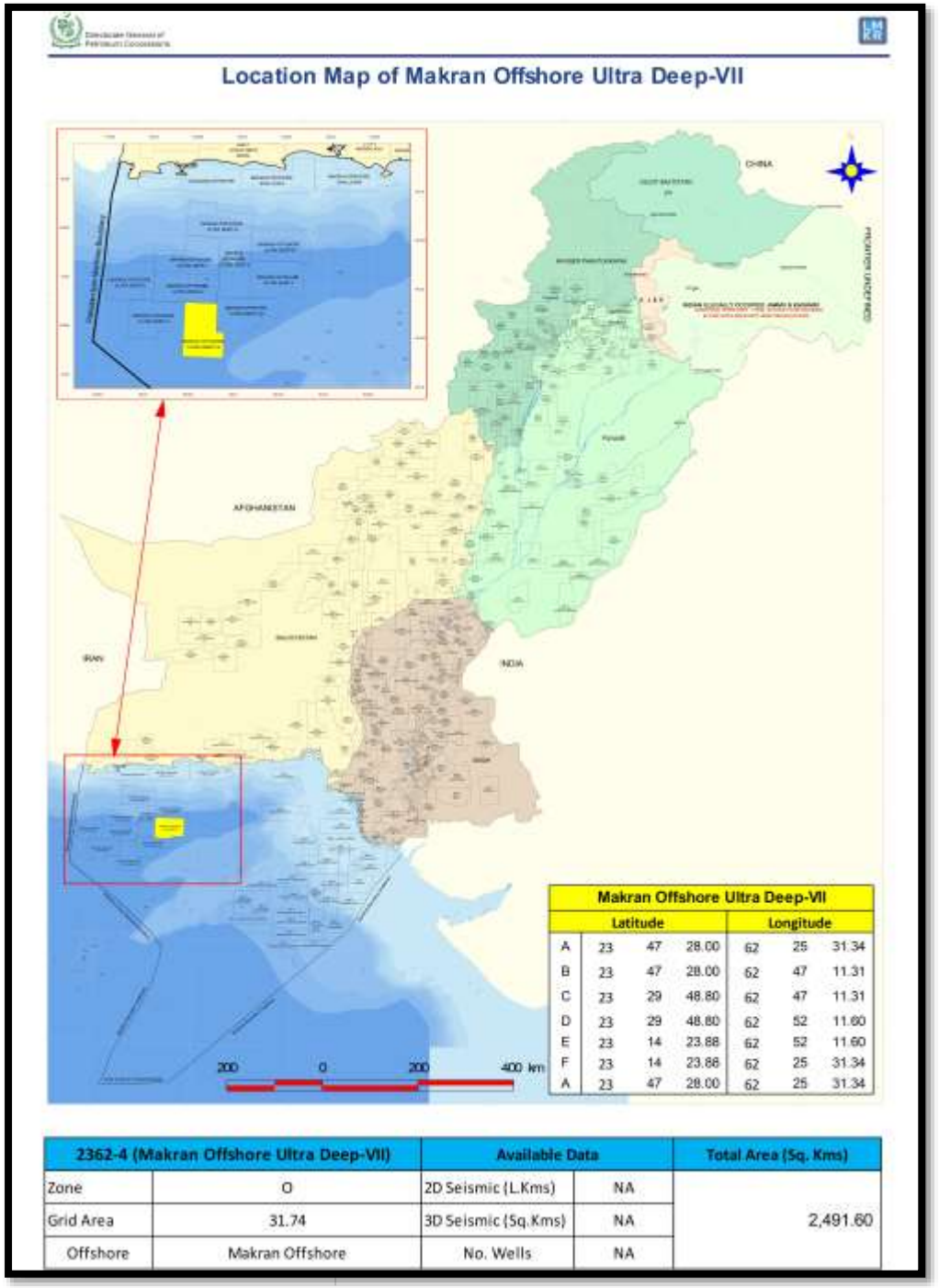
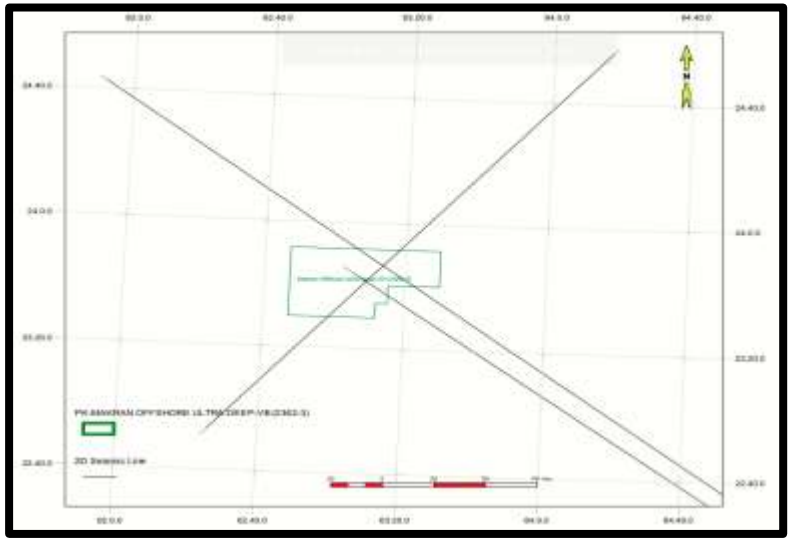


Makran Offshore Ultra Deep-VII	Latitude			Longitude		
A	23	47	28.00	62	25	31.34
B	23	47	28.00	62	47	11.31
C	23	29	48.80	62	47	11.31
D	23	29	48.80	62	52	11.60
E	23	14	23.88	62	52	11.60
F	23	14	23.88	62	25	31.34
A	23	47	28.00	62	25	31.34

2362-4 (Makran Offshore Ultra Deep-VII)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	NA	2,491.60
Grid Area	31.74	3D Seismic (Sq.Kms)	NA	
Offshore	Makran Offshore	No. Wells	NA	

Makran Offshore Ultra Deep-VIII (2362-3)

- **Area:** Makran Offshore Ultra Deep-VIII covers an area of 2384.24 Sq. Kms.
- **Geological Basin**: Makran Offshore basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- NOIP, TEP,BP and CE acquired some 2D data approximately 408.19 (L. Kms) in the block within the years 2007 and 2019.
- The Block is surrounded by Makran Offshore Ultra Deep-II and Makran Offshore Ultra Deep-V (North), and Makran Offshore Ultra Deep-IV and Makran Offshore Ultra Deep-VII (West) blocks.



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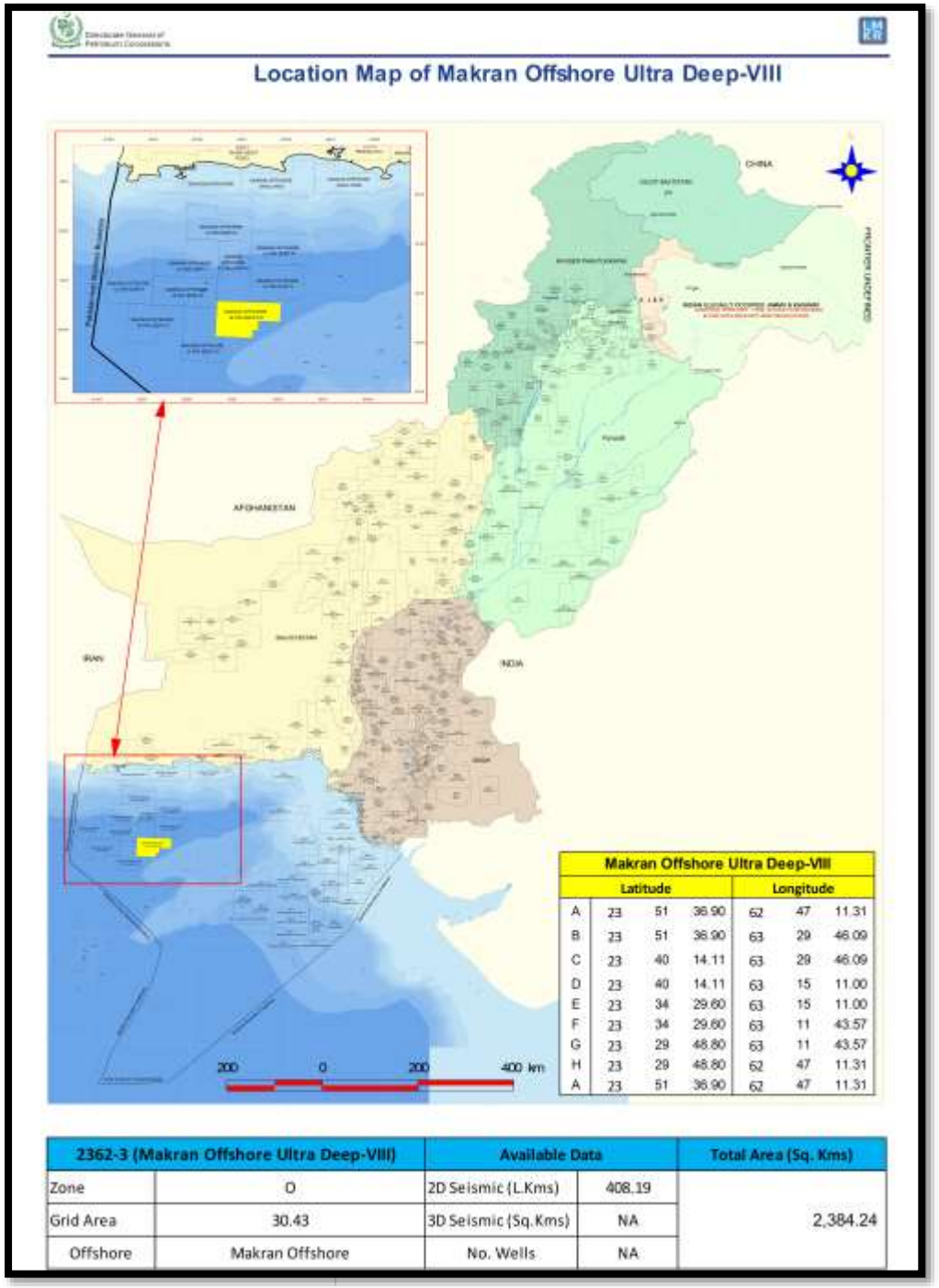
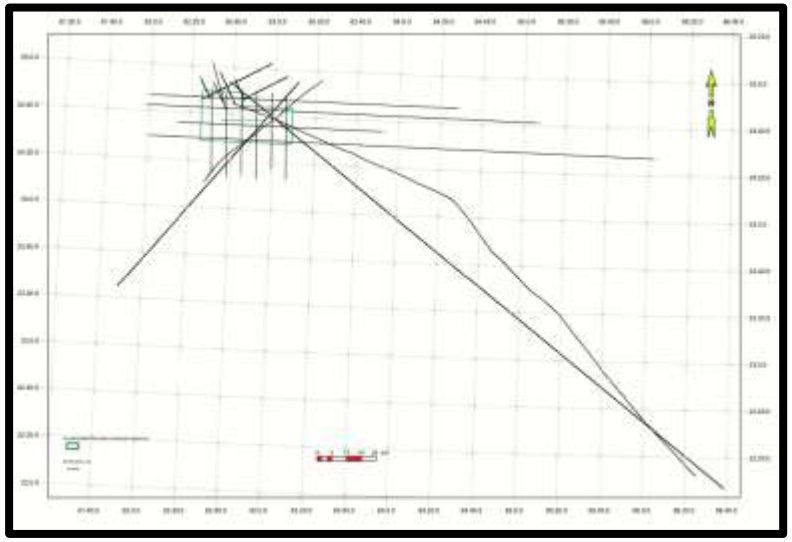


Makran Offshore Ultra Deep-VIII						
	Latitude			Longitude		
A	23	51	36.90	62	47	11.31
B	23	51	36.90	63	29	46.09
C	23	40	14.11	63	29	46.09
D	23	40	14.11	63	15	11.00
E	23	34	29.60	63	15	11.00
F	23	34	29.60	63	11	43.57
G	23	29	48.80	63	11	43.57
H	23	29	48.80	62	47	11.31
A	23	51	36.90	62	47	11.31

2362-3 (Makran Offshore Ultra Deep-VIII)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	408.19	2,384.24
Grid Area	30.43	3D Seismic (Sq.Kms)	NA	
Offshore	Makran Offshore	No. Wells	NA	

Makran Offshore Ultra Deep-IX (2462-4)

- **Area:** Makran Offshore Ultra Deep-IX covers an area of 2418.22 Sq. Kms.
- **Geological Basin**: Makran Offshore basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- NOIP, TEP,BP and CE acquired some 2D data approximately 2208.58 (L. Kms) in the block within the years 1973, 1976, 1997, 1998 and 2019.
- The Block is surrounded by Gawadar Offshore (North), Makran Offshore Ultra Deep-III (East), and Makran Offshore Ultra Deep-II and Makran Offshore Ultra Deep-I (South) blocks.



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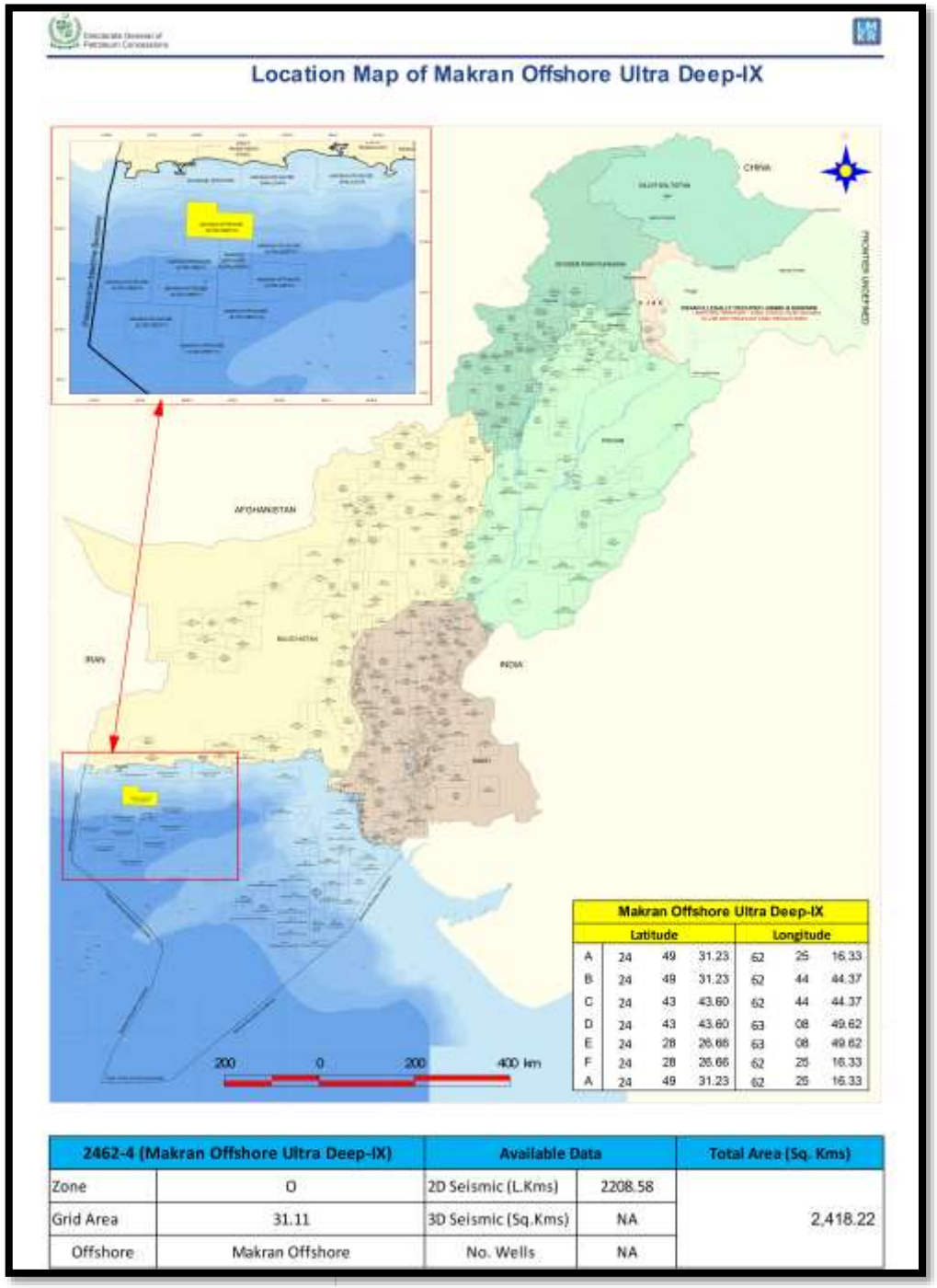
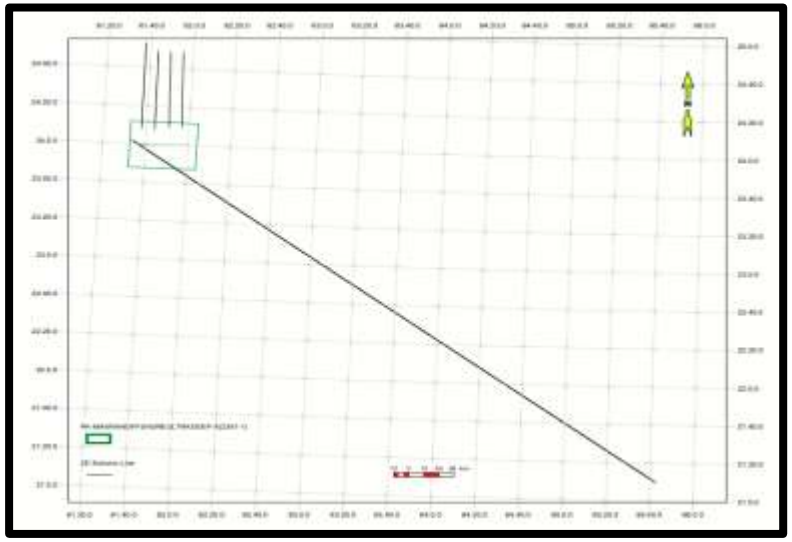


Makran Offshore Ultra Deep-IX						
	Latitude			Longitude		
A	24	49	31.23	62	25	16.33
B	24	49	31.23	62	44	44.37
C	24	43	43.60	62	44	44.37
D	24	43	43.60	63	08	49.62
E	24	28	26.66	63	08	49.62
F	24	28	26.66	62	25	16.33
A	24	49	31.23	62	25	16.33

2462-4 (Makran Offshore Ultra Deep-IX)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	2208.58	2,418.22
Grid Area	31.11	3D Seismic (Sq.Kms)	NA	
Offshore	Makran Offshore	No. Wells	NA	

Makran Offshore Ultra Deep-X (2361-1)

- **Area:** Makran Offshore Ultra Deep-X covers an area of 2369.38 Sq. Kms.
- **Geological Basin**: Makran Offshore basin, Pakistan.
- **Prospective Zone:** The block falls in Prospectivity Zone O.
- NOIP, TEP,BP and CE acquired some 2D data approximately 310 (L. Kms) in the block within the years 1999 and 2019.
- The Block is surrounded by Makran Offshore Ultra Deep-I and Makran Offshore Ultra Deep-IV (East) and Makran Offshore Ultra Deep-VI (South) blocks.



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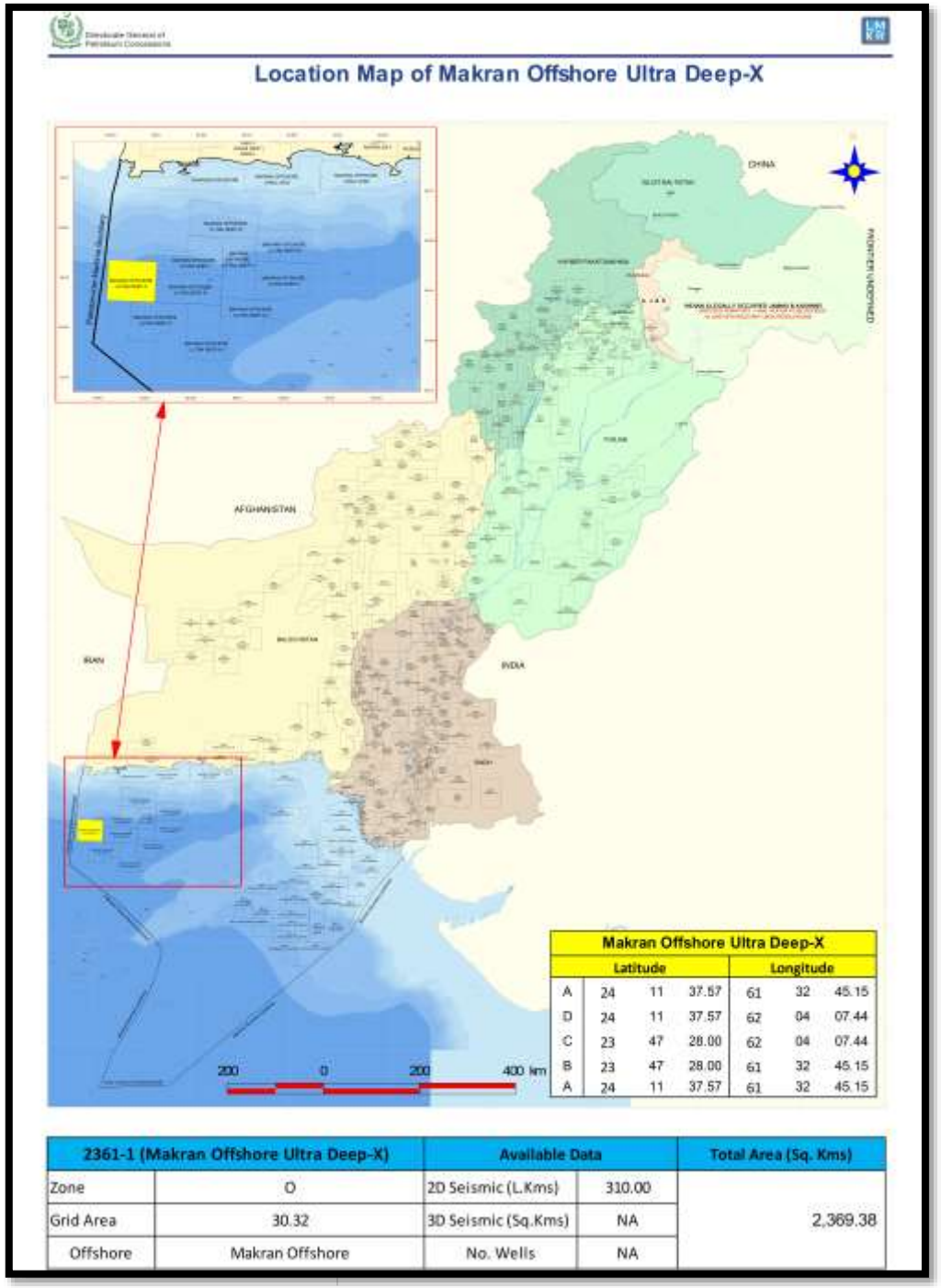
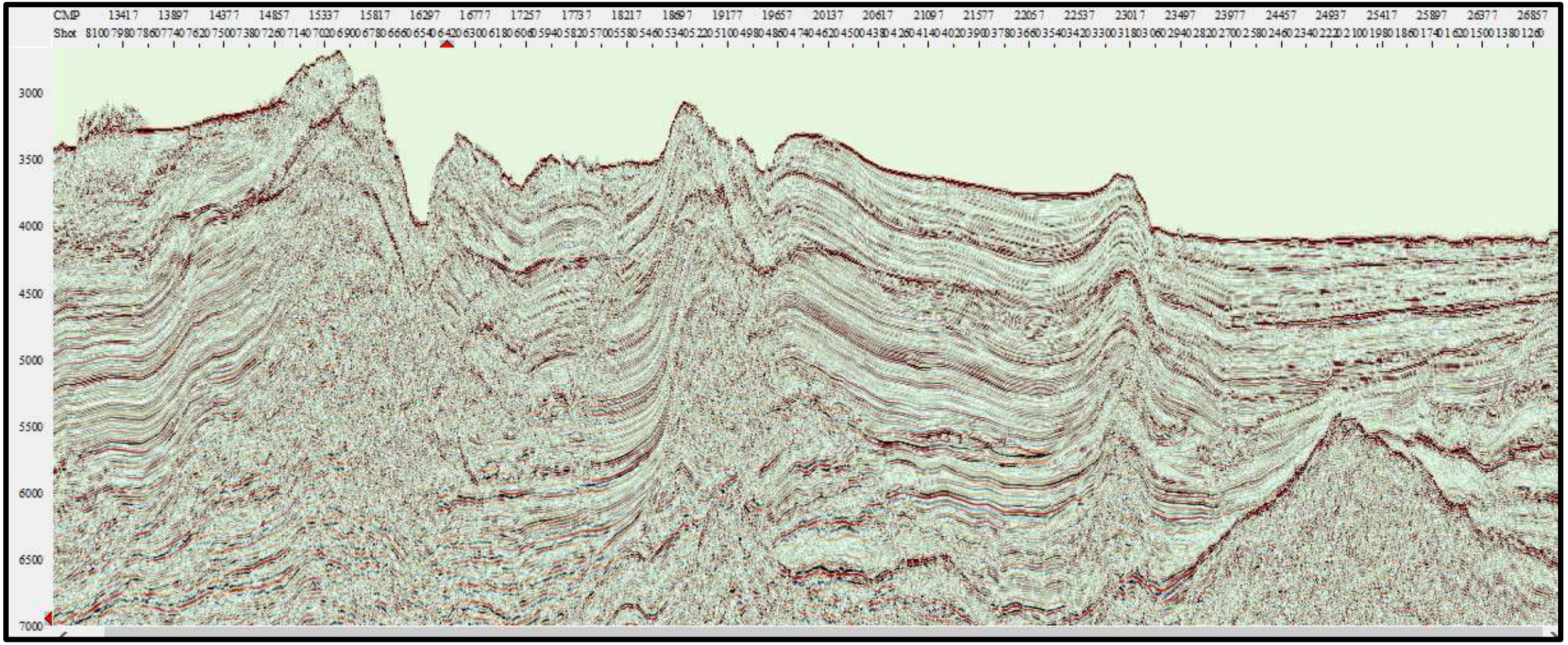


Makran Offshore Ultra Deep-X						
	Latitude			Longitude		
A	24	11	37.57	61	32	45.15
D	24	11	37.57	62	04	07.44
C	23	47	28.00	62	04	07.44
B	23	47	28.00	61	32	45.15
A	24	11	37.57	61	32	45.15

2361-1 (Makran Offshore Ultra Deep-X)		Available Data		Total Area (Sq. Kms)
Zone	O	2D Seismic (L.Kms)	310.00	2,369.38
Grid Area	30.32	3D Seismic (Sq.Kms)	NA	
Offshore	Makran Offshore	No. Wells	NA	

PROSPECTIVITY



- High resolution seismic data can allow to delineate true potential of the block
- Both structural and stratigraphic traps.

EXPLORATION RISKS

- Source & Charge: Medium to High risk.
- Reservoir: Medium to High risk.
- Seal: Medium to High risk.
- Trap: Medium to High risk.
- Key challenges for future exploration in Tertiary Petroleum System are to establish:

1. Distribution and timing of effective source intervals' development within the drainage area of prospect.
2. Timing of over-pressuring (up to 7000 psi at 2800m in Indus Marine-1A well) within Miocene section (for Miocene and younger targets) with respect to source rock maturation and expulsion.

THANK YOU